



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In Re the Application of:) Attorney Docket No.: 30011.24987
DANIEL P. GORDON, et al.)
Serial No.: 10/799,117) Art Unit: 3636
Filed: March 12, 2004)
For: SELF-CONTAINED AIR LIFTED SEAT) Examiner: Shirene Willis Brantley
APPARATUS

CERTIFICATE OF TRANSMISSION

I hereby certify that this **APPEAL BRIEF** and the accompanying **PETITION TO REIVIVE** under 37 CFR 1.137(b) are deposited via Express Mail in an envelope addressed to: Commissioner for Patents, Mail Stop Petitions, P.O. Box 1450, Alexandria, VA 22313-1450, on the date shown below.

Date:

SEPT 8 2008

By:

Debra L Klapp

APPEAL BRIEF

Sir:

This appeal brief is in response to the final rejection of claims 1-10, which was mailed May 14, 2007. A response was due in this case no later than November 14, 2007. A Notice of Appeal was filed on August 14, 2007, but an appeal brief was not filed within two months thereafter and the application became abandoned on November 14, 2007. Accordingly, Applicant submits herewith a petition to revive an unintentionally abandoned application, the \$1540 fee required under 37 CFR 1.17(m), this appeal brief and the \$510 fee required under 37 CFR 41.20(b)(2). Furthermore, the Commissioner is hereby authorized to charge deposit account 50-4538 these and any other necessary fees, or to credit any overages or refunds thereto. Please refer to Attorney Docket No. 30011.24987 when charging or crediting this account.

09/10/2008 WABDELRI 00000023 10799177

02 FC:1402 510.00 DA

09/10/2008 WABDELRI 00000023 504538 10799177

01 FC:1453 1540.00 DA

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Rules

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I. REAL PARTY IN INTEREST

The subject application has been assigned by co-inventors Daniel P. Guyton and Douglas Evans to Akron General Development Foundation. Accordingly, Akron General Development Foundation is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are currently no related appeals or interferences pending.

III. STATUS OF THE CLAIMS

Claims 1-10 are pending in this application, are under final rejection, and are the subject of this appeal.

IV. STATUS OF AMENDMENTS

An amendment was filed on July 13, 2007 but denied entry.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 1

The invention claimed in independent claim 1 comprises a device for assisting an individual in the act of sitting in and/or rising from a seat, which device is referred to as an “airlift seat apparatus.” See US. Appln. No., US20050200180A1, ¶ 27, line 4. A drawing of the device is shown in Figure 1 of the published application. The device includes a base member 10 to which a bladder 14 is attached and supported. See US. Appln. No., US20050200180A1, ¶ 27, line 5. The bladder 14 has a generally trapezoidal profile when fully inflated, and can be collapsed into a generally flat configuration when deflated. See US. Appln. No., US20050200180A1, ¶ 30, line 13-16. An individual seated on a deflated bladder can actuate a “rechargeable self-contained air compressor” 20 to inflate the bladder 14 through valve 16. See US. Appln. No., US20050200180A1, ¶ 27, line 6; ¶ 29, line 20-21; and US. Appln. No., US20050200180A1, ¶ 32, line 8-12. As the bladder 14 inflates the front portion 40 and rear portion 42 rise simultaneously, thus keeping the individual in a level but elevated seated position. See US. Appln. No., US20050200180A1, ¶ 32, line 8-12. However, as the bladder 14 continues to inflate the front portion 40 becomes fully extended and thus cannot rise further, but the rear portion 42 continues to rise. See Id. Thus, the individual’s weight is shifted forward thereby assisting the individual into a standing position.

Conversely, a standing individual can shift his weight rearward and against an inflated bladder 14, and actuate a valve for deflation of the bladder. See US. Appln. No., US20050200180A1, ¶ 32, line 25-32. Thus as the bladder 14 deflates the rear portion 42 drops to the level of the front portion 40 and the individual’s weight shifts rearward toward the seat. See Id. As the bladder 14 continues to deflate the rear portion 42 and front portion 40 descend together thereby maintaining the individual in a level seated position. See Id. Finally, when the bladder 14 is fully deflated the individual is in a final seated position. See Id.

Claim 1 also includes a compartment 18 adapted to contain the compressor 20, a hose for delivering air from the compressor 20 to the bladder 14, and a cover 22. See US. Appln. No., US20050200180A1, ¶ 27, line 6-7; and US. Appln. No., US20050200180A1, ¶ 29, line 18. The subject matter of independent claims 1 and 6 differ only in that claim 6 is drawn to separate inflation 60 and deflation 62 valves. See US. Appln. No., US20050200180A1, ¶ 31, line 18-19.

Claim 2

Claim 2 depends from claim 1 and explicitly adds that “the front portion [40] initially rises in unison with the rear portion [42].” See US. Appln. No., US20050200180A1 ¶ 30, line 12-13.

Claim 3

Claim 3 depends from claim 1 and adds that “the rear portion [42] is approximately 7 inches higher than the front portion [40] at full inflation.” See US. Appln. No., US20050200180A1, ¶ 12, line 5-7.

Claim 4

Claim 4 depends from claim 1 and adds that “the cover [22] comprises a selectively removable connecting means [27] so that the cover [22] may be removed from the base [12] and the bladder [14].” See US. Appln. No., US20050200180A1, ¶ 27, line 5-21. Furthermore, the “connecting means” can be snaps, hook and loop fasteners, Velcro®, zippers or equivalents thereof. See Id.

Claim 5

Claim 5 depends from claim 1 and adds that “the top of the cover [22] further contains material [38] to minimize slippage.” See US. Appln. No., US20050200180A1, ¶ 28, line 24-25; and US. Appln. No., US20050200180A1, Figure 2, element 38.

Claim 6

The invention claimed in independent claim 6 comprises a device for assisting an individual in the act of sitting in and/or rising from a seat, which device is referred to as an “airlift seat apparatus.” See US. Appln. No., US20050200180A1, ¶ 27, line 4. A drawing of the device is shown in Figure 1 of the published application. The device includes a base member 10 to which a bladder 14 is attached and supported. See US. Appln. No., US20050200180A1, ¶ 27, line 5. The bladder 14 has a generally trapezoidal profile when fully inflated, and can be collapsed into a generally flat configuration when deflated. See US. Appln. No., US20050200180A1, ¶ 30, line 13-16. An individual seated on a deflated

bladder can actuate a “rechargeable self-contained air compressor” 20 to inflate the bladder 14 through a first valve 60. See US. Appln. No., US20050200180A1, ¶ 27, line 6; ¶ 31, line 18; and US. Appln. No., US20050200180A1, ¶ 32, line 8-12. As the bladder 14 inflates the front portion 40 and rear portion 42 rise simultaneously, thus keeping the individual in a level but elevated seated position. See US. Appln. No., US20050200180A1, ¶ 32, line 8-12. However, as the bladder 14 continues to inflate the front portion 40 becomes fully extended and thus cannot rise further, but the rear portion 42 continues to rise. See Id. Thus, the individual’s weight is shifted forward thereby assisting the individual into a standing position.

Conversely, a standing individual can shift his weight rearward and against an inflated bladder 14, and actuate a valve 62 for deflation of the bladder. See US. Appln. No., US20050200180A1, ¶ 31 line 19; and US. Appln. No., US20050200180A1, ¶ 32, line 25-32. Thus, as the bladder 14 deflates, the rear portion 42 drops to the level of the front portion 40 and the individual’s weight shifts rearward toward the seat. See Id. As the bladder 14 continues to deflate, the rear portion 42 and front portion 40 descend together, thereby maintaining the individual in a level seated position. See Id. Finally, when the bladder 14 is fully deflated the individual is in a final seated position. See Id.

Claim 6 also includes a compartment 18 adapted to contain the compressor 20, a hose for delivering air from the compressor 20 to the bladder 14, and a cover 22. See US. Appln. No., US20050200180A1, ¶ 27, line 6-7; and US. Appln. No., US20050200180A1, ¶ 29, line 18. The subject matter of independent claims 1 and 6 differ only in that claim 6 is drawn to separate inflation 60 and deflation 62 valves. See US. Appln. No., US20050200180A1, ¶ 31, line 18-19.

Claim 7

Claim 7 depends from claim 6 and explicitly adds that “the front portion [40] initially rises in unison with the rear portion [42].” See US. Appln. No., US20050200180A1, ¶ 30, line 12-13.

Claim 8

Claim 8 depends from claim 6 and adds that “the rear portion [42] is approximately 7 inches higher than the front portion [40] at full inflation.” See US. Appln. No., US20050200180A1, ¶ 12, line 5-7.

Claim 9

Claim 9 depends from claim 6 and adds that “the cover [22] comprises a selectively removable connecting means [27] so that the cover [22] may be removed from the base [12] and the bladder [14].” See US. Appln. No., US20050200180A1, ¶ 27, line 5-21. Furthermore, the “connecting means” can be snaps, hook and loop fasteners, Velcro [®], zippers or equivalents thereof. See Id.

Claim 10

Claim 10 depends from claim 6 and adds that “the top of the cover [22] further contains material [38] to minimize slippage.” See US. Appln. No., US20050200180A1, ¶ 28, line 24-25; and US. Appln. No., US20050200180A1, Figure 2, element 38.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1st Ground for Rejection

Referring now to the Office action mailed on May 14, 2007, the Examiner has rejected claims 1-3 and 6-8 under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 5,361,433 to Vanzant in view of US Patent No. 6,113,188 to Stewart et al. More specifically, the Examiner contends that “Vanzant disclose[s] an air lifted seat apparatus that is basically the same as that recited in claims 1-3 and 6-8 except that the apparatus lacks a rigid base, a cover, a compartment, self-contained air compressor, and a second valve as recited in the claims.” See Office Action, pg. 2, (May 14, 2007). The Examiner further contends that “Stewart et al. show an air lifted seat apparatus similar to that of Vanzant wherein the apparatus has a rigid base 12 (see Fig. 1), an inflatable bladder 16, a compartment (see Fig. 5) located near a side panel of the bladder, a rechargeable self-contained air compressor 18 connected to the base, a cover 14 positioned over the bladder and operatively connected to the base, and a valve 32 devoted to deflation.” See Office Action, pg. 2-3, (May 14, 2007). Finally, the Examiner concludes that “it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Vanzant [so as to include the elements of Stewart et al.]” See Office Action, pg. 3, (May 14, 2007). The Examiner also asserts that “[o]ne would have been motivated to make such modification in view of the suggestion in Stewart et al. that the rigid base and cover provide a carrying case for transporting the apparatus, the self-contained air compressor in the compartment provides a battery powered compressor small enough to fit within the carrying case, and the deflation valve allows for lowering the bladder.” See Office Action, pg. 3, (May 14, 2007).

2nd Ground for Rejection

The Examiner has also rejected claims 4, 5, 9, and 10 under 35 U.S.C. §103(a) as being unpatentable over Vanzant in view of Stewart as applied to claims 1-3 and 6-8 and in further view of US Patent No. 6,264,279 to Chow. More specifically, the Examiner contends that “Vanzant, as modified [by Stewart et al.], discloses a seat apparatus that is basically the same as that recited in claims 4, 5, 9, and 10 except that the cover lacks a connecting means.” See Office Action, pg. 4, (May 14, 2007). The Examiner further contends that “Chow shows a seat apparatus similar to that of Vanzant wherein a cover 268 (Fig. 14a) has a removable connecting means and contains material to minimize slippage.” See Office Action, pg. 4, (May 14, 2007). Therefore, the Examiner concludes that “it would have been obvious to one having

ordinary skill in the art at the time the invention was made to further modify the seat apparatus of Vanzant such that the cover has a removable connecting means and contains material to minimize slippage.” See Office Action, pg. 4, (May 14, 2007). The Examiner also asserts that “[o]ne would have been motivated to make such a modification in view of the suggestion in Chow that the removable cover protects from debris and is water resistant.” See Office Action, pg. 4, (May 14, 2007).

VII. ARGUMENT

Claims Grouping:

Claims 1-3 and 6-8 constitute a group and are argued in the section entitled Response to 1st Ground for Rejection.

Claims 4, 5, 9, and 10 constitute a group and are argued in the section entitled Response to 2nd Ground for Rejection.

Response to 1st Ground for Rejection

The Examiner contends that the teachings of independent claims 1 and 6 as well as dependent claims 2, 3, 7, and 8 can be found in the prior art by combining the Vanzant and Stewart et al. See 35 U.S.C. §103(a). references. More specifically, the Examiner states, *inter alia*, that the rigid base and cover of Stewart et al. can be combined with the inflatable bladder of Vanzant to arrive at the rigid base, inflatable bladder and cover of the present invention. See Office Action, pg. 2, (May 14, 2007). However, the Vanzant and Stewart et al. references are not combinable because the Vanzant device is wholly incompatible with the theory of operation of the Stewart et al. device, and would indeed produce an inoperable result. See McGinley v. Franklin Sports Inc., 262 F.3d 1339 (Fed. Cir. 2001); In re Spinnoble, 405 F.2d 578 (C.C.P.A. 1969) (“*references teach away from combination if the combination produces a seemingly inoperable device*”).

The inflatable bladder of Vanzant is shaped in the nature of a chair, even in the fully deflated state, and directly contacts and conforms to the buttocks and back of a user. Accordingly, as the Vanzant bladder inflates, its shape changes from a relatively thin, chair-like profile having a generally level seat to a relatively thick, chair-like profile having a generally trapezoidal seat that shifts the user up and forward to a standing position. See Vanzant, Fig. 5a and 5b. Furthermore, compartments in the Vanzant bladder fill in a predetermined order so that the Vanzant bladder tends to cup the user’s buttocks, which results in enhanced lateral stability.

In contrast the rigid base and cover of the Stewart et al. device operate in consort with one another through a set of scissor braces, which connect the base to the cover in an extendable/collapsible relation. The base and cover of Stewart et al. enclose an expandable bladder having a generally rectangular top and bottom that are spaced apart and connected by accordion-like sides. Thus, the

bladder of Stewart et al. is in the nature of a bellows. See Stewart et al., Fig. 1. A top surface of the bladder contacts the underside of the cover, and a bottom surface of the bladder contacts the base. Accordingly, as the bladder inflates it forces the cover away from the base. However, the cover is attached to the base by the scissor braces. Therefore, the cover is guided by the braces and thereby sweeps out an arced path such that the cover arrives at an oblique angle relative to the base. See Stewart et al. Fig. 7 compared to Stewart et al. Fig. 1. Thus, the user is shifted up and forward away from the base. Furthermore, the Stewart et al. device relies solely on the scissor braces for lateral stability. Without these, the cover (and user) would simply fall off.

While it may be straight forward to add a rigid base similar to that of Stewart et al. under the seat of the Vanzant device, there is no way to add the Stewart et al. cover with scissor braces to Vanzant without rendering Vanzant inoperable. See McGinley, 262 F.3d 1339. In order to separate the cover from the base Stewart et al. requires a vertically collapsible bladder capable of developing strength in a generally vertical direction upon inflation. Vanzant does not teach or suggest such a bladder, but rather discloses a bladder having a substantially fixed height that becomes thicker upon inflation. Accordingly, the combination of Vanzant and Stewart et al. would necessarily render an inoperable result. See Id.

Furthermore, in order to render the Vanzant bladder able to open a Stewart base and cover, it would need to be converted from a chair-like shape having a fixed height and variable thickness to a variable height bladder having any arbitrary thickness. Thus, its redesign would be so substantial as to change the basic principles under which the Vanzant bladder was designed to operate. See In re Ratti, 123 USPQ 349, 352 (C.C.P.A. 1959)(“ We hold, further, that the combination of Jepson with Chinnery et al. is not a proper ground for rejection of the claims here on appeal. This suggested combination of references would require a substantial reconstruction and redesign of the elements shown in Chinnery et al. as well as change in the basic principles under which the Chinnery et al. construction was designed to operate.”).

Still further, the cover of Stewart et al. is structurally and functionally distinct from the cover of the claimed invention. The Stewart et al. cover functions as a seat for a user, and as a carrying case. In contrast the cover of the claimed invention enables a smooth and comfortable inflation. More specifically, the cover of the claimed invention allows the bladder to unfold and expand under the user's buttocks. Whereas, in the absence of the cover, the bladder would tend to repeatedly stick to, and break free from, the user's skin as it inflates, creating an uncomfortable condition. Thus, while the covers of the cited art and the claimed invention may share the same name, their structure and function

are entirely different. Accordingly, the combination of Vanzant and Stewart et al. does not teach or suggest each and every element of the claimed invention and therefore cannot render the claimed invention obvious.

Finally, the clever design of the claimed invention obviates the need for the lateral supports of Vanzant and/or Stewart et al. Specifically, the cover of the claimed invention is operatively attached to the base. Accordingly, as a lateral force is applied the bladder begins to lean in the direction of the force; however, this motion causes tension in the cover, which effectively limits lateral motion. Thus the device, and therefore the user, is stabilized without the need for the added components that are required to stabilize the cited art. This inventive cover feature of the claimed invention is neither taught nor suggested by the cited art. Accordingly, the combination of Vanzant and Stewart et al. cannot render the claimed invention obvious.

Each of the foregoing arguments apply equally well to both independent claims 1 and 6, and therefore to claims 2, 3, 7, and 8 which depend from claims 1 and 6. Accordingly, each of the rejected claims is non-obvious, and the Appellant respectfully requests that the Board reverse the Examiner's rejection.

Response to 2nd Ground for Rejection

The Examiner has also rejected claims 4, 5, 9, and 10 under 35 U.S.C. §103(a) as being unpatentable over Vanzant in view of Stewart et al. as applied to claims 1-3 and 6-8 and in further view of US Patent No. 6,264,279 to Chow. More specifically, the Examiner contends that his first ground for rejection can be simply restated with the addition of a removable connecting means and a material to minimize slippage as disclosed by Chow. See Office Action, Pg. 4. (May 14, 2007). Accordingly, the Appellant's response to the first ground for rejection similarly defeats the second ground for rejection regardless of any disclosure by Chow of a connecting means and/or an anti-slip material. Claims 4, 5, 9, and 10 being dependent from claims 1 and 6 must be similarly non-obvious. Accordingly, the Appellant respectfully requests the Board to reverse this rejection as well.

VIII. CLAIMS APPENDIX

1. A portable air lifted seat apparatus comprising:
 - a rigid base;
 - a one-piece inflatable bladder positioned on the base comprising:
 - (i) a front portion, wherein the front portion is constructed to be rectangular;
 - (ii) a rear portion, wherein the rear portion is constructed to be rectangular and wherein the height of the rear portion on full inflation of the inflatable bladder is at least three times the height of the front portion;
 - (iii) first and second trapezoidal shaped side panels operatively connecting the front and rear portions;
 - a valve for inflation and deflation of the bladder, the valve operatively connected to one of the first and second side panels of the bladder;
 - a compartment located at one of the first and second side panels of the bladder and operatively connected to the base;
 - a rechargeable, self-contained air compressor for use in inflating the bladder, the air compressor positioned in the compartment;
 - a hose having first and second ends, wherein the hose is operatively connected to an output of the compressor at the first end and to the valve at the second end; and,
 - a cover positioned over the bladder and operatively connected to the base.

2. The portable air lifted seat apparatus of claim 1, wherein the front portion initially rises in unison with the rear portion.

3. The portable air lifted seat apparatus of claim 2, wherein the rear portion is approximately 7 inches higher than the front portion at full inflation.

4. The portable air lifted seat apparatus of claim 1, wherein the cover comprises;
a selectively removable connecting means so that the cover may be removed from the base and the bladder.

5. The portable air lifted seat apparatus of claim 4, wherein the top of the cover further contains material to minimize slippage.

6. A portable air lifted seat apparatus comprising:

a rigid base;

a one-piece inflatable bladder positioned on the base comprising:

(i) a front portion, wherein the front portion is constructed to be rectangular;

(ii) a rear portion, wherein the rear portion is constructed to be rectangular and wherein the height of the rear portion on full inflation of the inflatable is at least three times the height of the front portion;

(iii) first and second trapezoidal shaped side panels operatively connecting the front and rear portions;

a first valve for inflation of the bladder operatively connected to one of the first and second panels of the bladder;

a second valve for deflation of the bladder operatively connected to one of the first and second side panels of the bladder;

a compartment located at one of the first and second side panels of the bladder and operatively connected to the base;

a rechargeable, self-contained air compressor for use in inflating the bladder, the air compressor positioned in the compartment;

a hose having first and second ends, wherein the hose is operatively connected to an output of the compressor at the first end and to the first valve at the second end; and,

a cover positioned over the bladder and operatively connected to the base.

7. The portable air lifted seat apparatus of claim 6, wherein the front portion initially rises in unison with the rear portion.

8. The portable air lifted seat apparatus of claim 7, wherein the rear portion is approximately 7 inches higher than the front portion at full inflation.

9. The portable air lifted seat apparatus of claim 6, wherein the cover further comprises:

a selectively removable connecting means so that the cover may be removed from the base and the bladder

10. The portable air lifted seat apparatus of claim 9, wherein the top of the cover further contains material to minimize slippage.

IX. EVIDENCE APPENDIX

Office Action

1. Final Office Action, May 14, 2007.

The Subject Application

2. Published Application No. 10/799,117

The Cited Art

3. US Patent No. 5,361,433 to Vanzant
4. US Patent No. 6,113,188 to Stewart et al.
5. US Patent No. 6,264,279 to Chow

Case Law

6. McGinley v. Franklin Sports Inc., 262 F.3d 1339 (Fed. Cir. 2001).
7. In re Ratti, 123 U.S.P.Q. 349 (C.C.P.A. 1959).



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,117	03/12/2004	Daniel P. Guyton	30011.24987	7081

7590 05/14/2007
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EXAMINER

EDELL, JOSEPH F

ART UNIT	PAPER NUMBER
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3636

MAIL DATE	DELIVERY MODE
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05/14/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/799,117	Applicant(s) GUYTON ET AL.	
	Examiner Joseph F. Edell	Art Unit 3636	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,361,433 to Vanzant in view of U.S. Patent No. 6,113,188 to Stewart et al.

Vanzant disclose an air lifted seat apparatus that is basically the same as that recited in claims 1-3 and 6-8 except that the apparatus lacks a rigid base, a cover, a compartment, self-contained air compressor, and a second valve, as recited in the claims. See Figures 1-6d of Vanzant for the teaching that the apparatus has a one-piece inflatable bladder (see Fig. 1) including a rectangular front portion, a rectangular rear portion with a height at least three times the height of the front portion upon full inflation, and first and second trapezoidal shaped side panels operatively connected to the front and rear portions, a valve (see Fig. 2) operatively connected to one of the first and second side panels, an air compressor 14, and a hose 18,62 with first end connected to the compressor and a second end connected to the valve wherein the front portion rises in unison with the rear portion. Stewart et al. show an air lifted seat apparatus similar to that of Vanzant wherein the apparatus has a rigid base 12 (see Fig.

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1), an inflatable bladder 16, a compartment (see Fig. 5) located near a side panel of the bladder, a rechargeable self-contained air compressor 18 connected to the base, a cover 14 positioned over the bladder and operatively connected to the base, and a valve 32 devoted to deflation. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Vanzant such that the apparatus has a rigid base connected to the bladder, a compartment located at one of the side panels of the bladder and operatively connected to the base, the air compressor is a rechargeable, self-contained, and positioned in the compartment, a cover positioned over the bladder and operatively connected to the base, and a second valve for deflation and operatively connected to a side panel, such as the apparatus disclosed by Stewart et al. One would have been motivated to make such a modification in view of the suggestion in Stewart et al. that the rigid base and cover provide a carrying case for transporting the apparatus, the self-contained air compressor in the compartment provides a battery powered compressor small enough to fit within the carrying case, and the deflation valve allows for lowering the bladder.

With respect to claims 3 and 8, modifying the height of the rear portion to be approximately 7 inches higher than the front portion at full inflation would have been obvious at the time of Applicant's inventions because the use of optimal or workable ranges discovered by routine experimentation is ordinarily within the skill of the art. Further, it would have been an obvious matter of design choice to modify the height of the rear portion of the bladder since Applicant has not disclosed that having the specific height range solves any stated problem or is for any particular purpose, and it appears

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that the bladder would perform equally well with any well known height range used in the seat art.

3. Claims 4, 5, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vanzant in view of Stewart et al. as applied to claims 1-3 and 6-8 above, and further in view of U.S. Patent No. 6,264,279 B1 to Chow.

Vanzant, as modified, discloses a seat apparatus that is basically the same as that recited in claims 4, 5, 9, and 10 except that the cover lacks a connecting means, as recited in the claims. Chow shows a seat apparatus similar to that of Vanzant wherein a cover 268 (Fig. 14a) has a removable connecting means and contains material to minimize slippage. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the seat apparatus of Vanzant such that the cover has a removable connecting means and contains material to minimize slippage, such as the seat apparatus disclosed in Chow. One would have been motivated to make such a modification in view of the suggestion in Chow that the removable cover protects from debris and is water resistant.

Response to Arguments

4. Applicant's arguments filed 22 February 2007 have been fully considered but they are not persuasive. Initially, Applicant argues that Vanzant fails to teach first and second trapezoidal-shaped side panels operatively connecting front and rear portions. Figure 5b of Vanzant clearly shows that the side panels are trapezoidal in shape and connect front and rear portions of the inflatable bladder. Next, Applicant argues that the

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neither Vanzant nor Stewart et al. teach a valve operatively connected to a side panel of the bladder. Vanzant teaches an air distribution system comprised on tubes 18,64,66 wherein the tubes are operatively connected to the side panels of bladder -- as shown in Figure 4. Stewart et al. teaches the utilization of including a valve to aid in controlling inflation and deflation of a bladder. Based on the teachings of Stewart et al., it would have been obvious to one skilled in the art to include a valve operatively connected to a side panel of the bladder taught in Vanzant via the air distribution system. Lastly, Applicant argues that neither Vanzant nor Stewart et al. teach a compartment located at one of the side panels of the bladder and operatively connected to the base. However, Stewart et al. clearly show two compartments located at one of a bladder panel and operatively connected to the base. See Figures 3-5 of Stewart et al. for the teaching that the air compressor 18 is housed with a compartment and the battery 19 is housed with a compartment, both of which are connected to the base 12.

With respect to Applicant's argument that Stewart et al. fail to provide motivation to combine the references for a lack of desirability, the inventive concept centrally addressed by Stewart et al. is the utilization of a portable seat to assist the user in sitting and standing. Stewart et al. teach a rigid carrying case housing the bladder, air compressor controlling inflation/deflation of the bladder via a valve, and battery. One skilled in the art would have been motivated to combine the teachings of Vanzant and Stewart et al. because of the desirable portable configuration taught in Stewart et al. Moreover to one skilled in the art, it would have been obvious to try to have a bladder

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with a rigid base, an operatively connected valve, a compartment operatively connected to the base, in view of the teachings in Vanzant and Stewart et al.

With respect to the teachings of Chow, Applicant argues that Chow fails to teach a connecting means for a cover. Applicant attempts to differentiate the teachings of Chow because the flap 268 is connected to a *bag* 260, which is not specifically recited as a cover. From the teachings of Chow (as shown in Figure 14a), the cushion 200 is enclosed by a bag 260 having a bottom, side, and top that includes a flap 268 which is removably coupled to the bag's bottom. While Chow may have labeled the cushion enclosure as a "bag," one skilled in the art would have been motivated from the teachings in Chow to have a removable connected cover of a bladder enclosure wherein the cover contains material to minimize slippage. Moreover, claim 4 merely recites the cover include a removable connecting means. Vanzant clearly shows a cover with a connecting means connecting it to the bladder. Examiner reasonably interprets the modifier "removable" as being capable of being removed. Therefore, Vanzant may inherently teach a cover capable of being removed if adequate force is applied.

The rejection under 35 USC 103(a) drawn toward claims 3 and 8 was argued solely on the premise that the cited art does not teach or suggest the apparatus recited in amended claims 1, 2, 6, and 7, and as a result the above 35 USC 103(a) rejection of claims 3 and 8 remains.

Upon consideration of the Applicant's arguments, Examiner maintains the rejections of claims 1-10.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph F. Edell whose telephone number is (571) 272-6858. The examiner can normally be reached on Mon.-Fri. 8:30am-5:00pm.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read "Joe Edell", written over the printed name.

Joe Edell

May 10, 2007



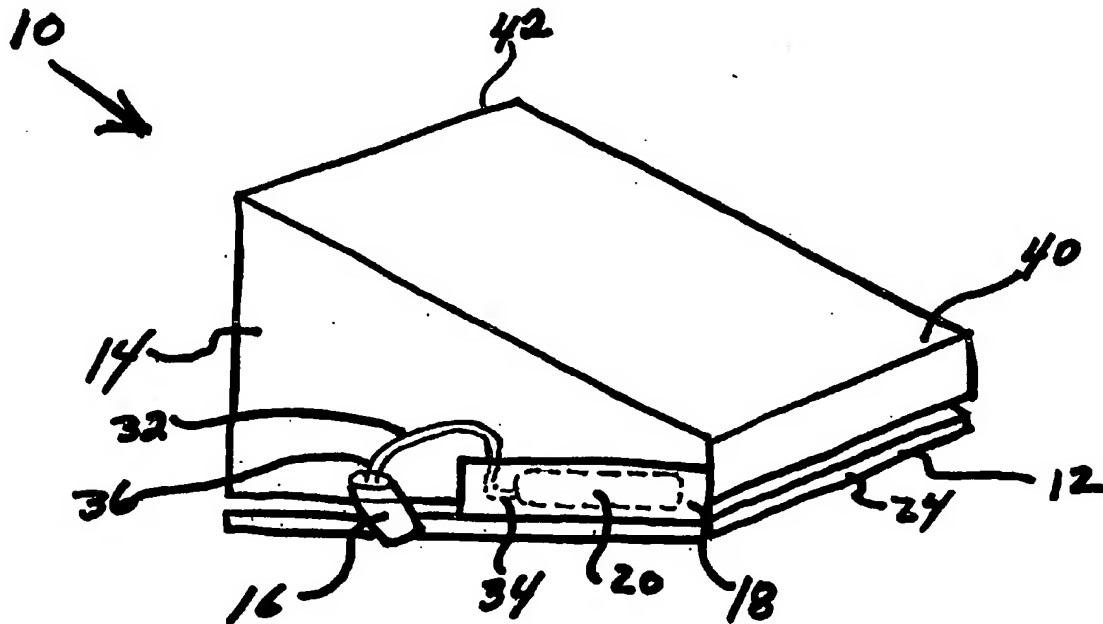
US 20050200180A1

(19) **United States**(12) **Patent Application Publication** (10) Pub. No.: **US 2005/0200180 A1**
Guyton et al. (43) Pub. Date: **Sep. 15, 2005**(54) **SELF-CONTAINED AIR LIFTED SEAT
APPARATUS**(22) Filed: **Mar. 12, 2004****Publication Classification**(75) Inventors: **Daniel P. Guyton, Akron, OH (US);
Douglas M. Evans, Akron, OH (US)**(51) Int. Cl.⁷ **A47C 4/54**(52) U.S. Cl. **297/313**

Correspondence Address:

Roger D. Emerson**Brouse McDowell, LPA****Ste. 500****106 S. Main Street****Akron, OH 44308-1471 (US)**(57) **ABSTRACT**

A lightweight and portable pneumatic lifting device includes an inflatable, trapezoidal side shaped and self-contained bladder housed in a removable, washable material. The inferior surface of the bladder contains a rigid base for stability. Located on one side of the bladder is a compartment to house the self-contained air compressor. A valve or valves is provided for inflation and deflation of the bladder.

(73) Assignee: **AKRON GENERAL DEVELOP-
MENT FOUNDATION**(21) Appl. No.: **10/799,117**

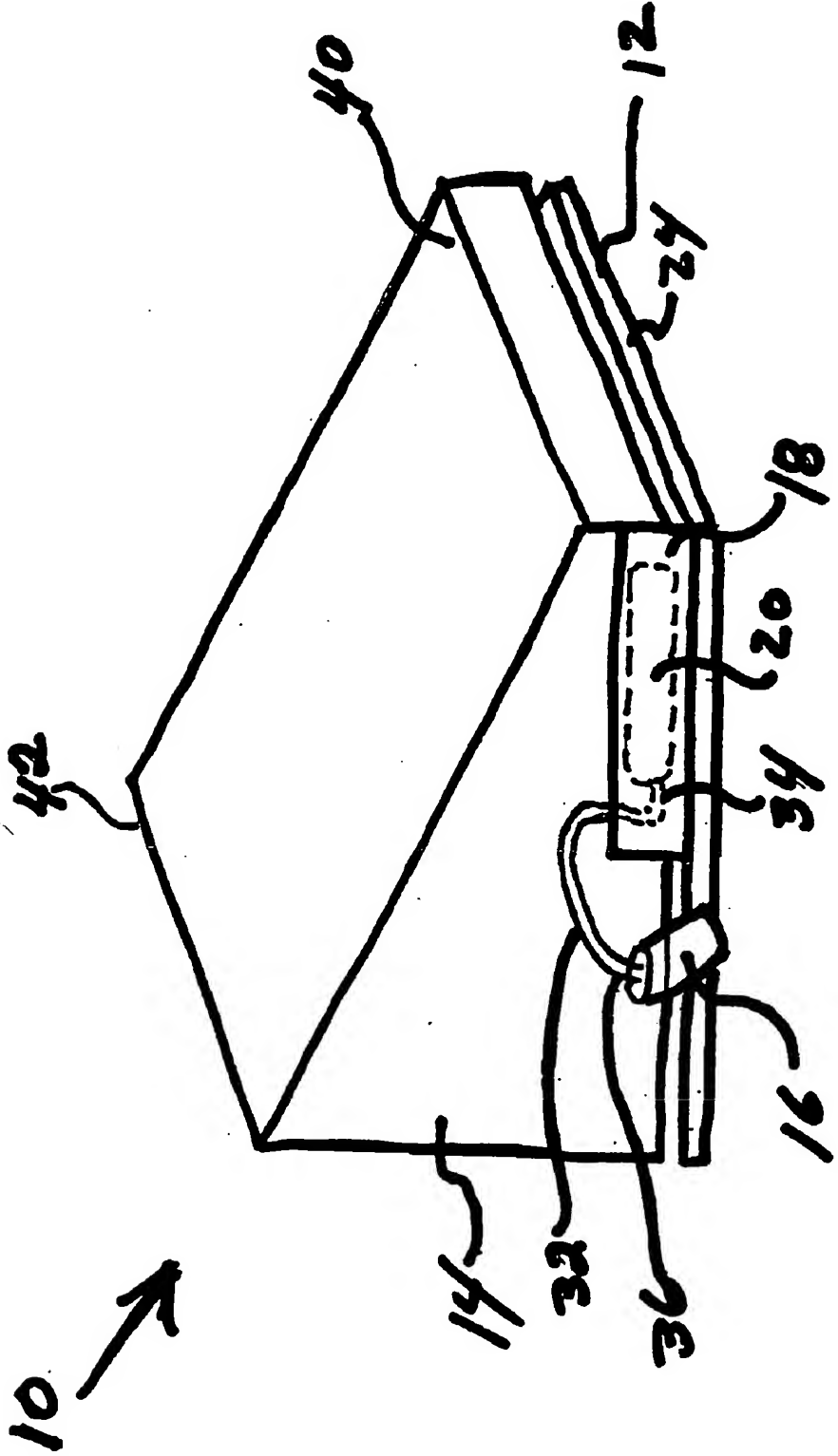


Fig. 1

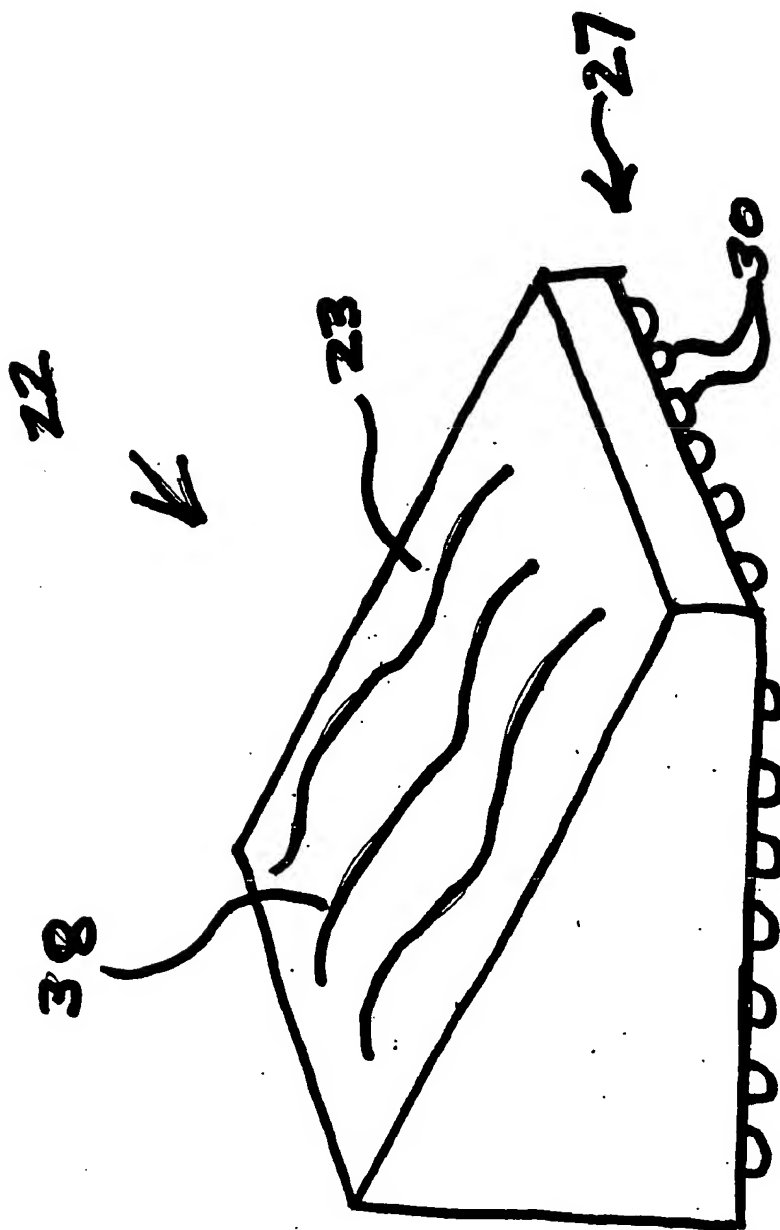
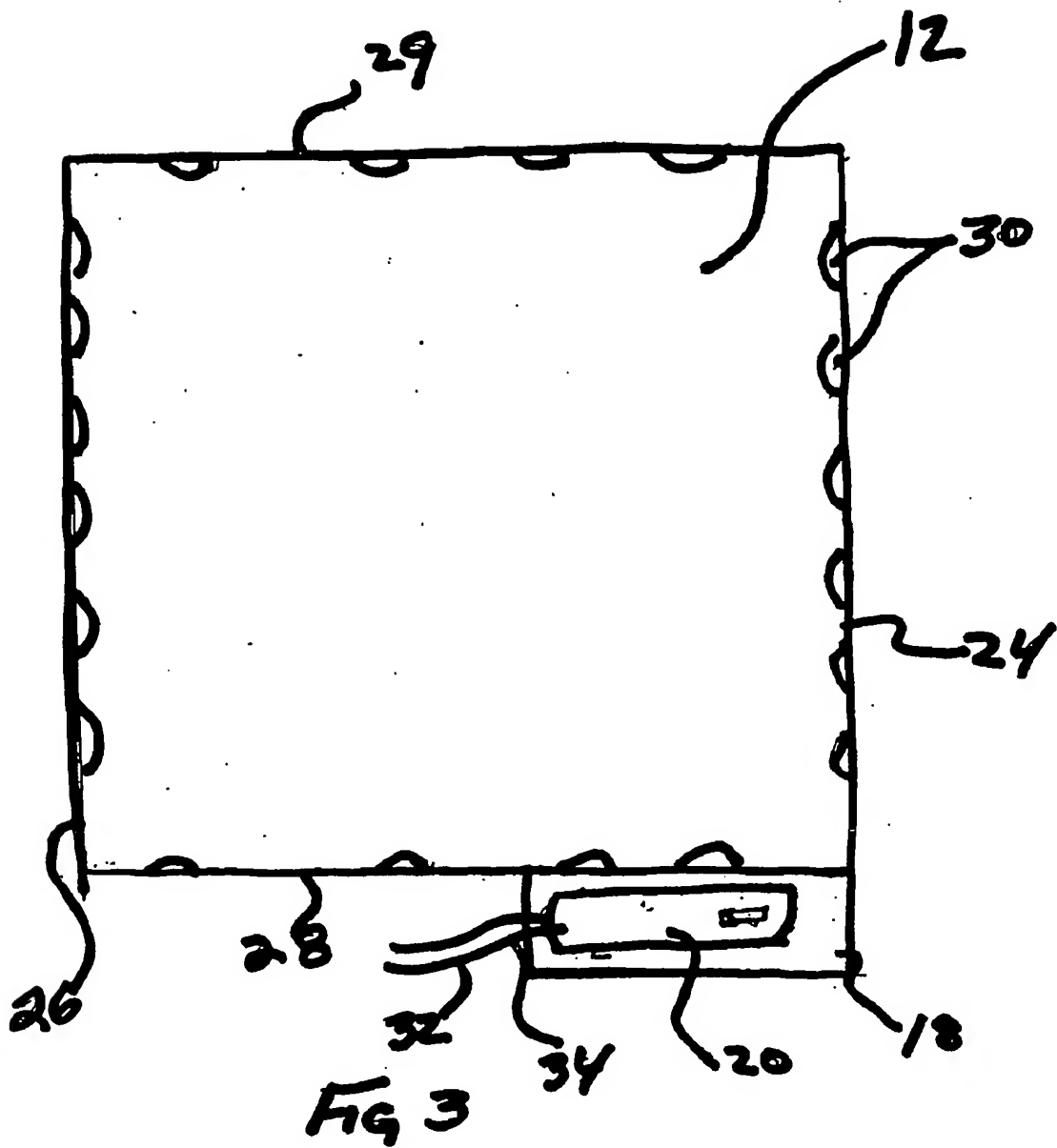


FIG. 2



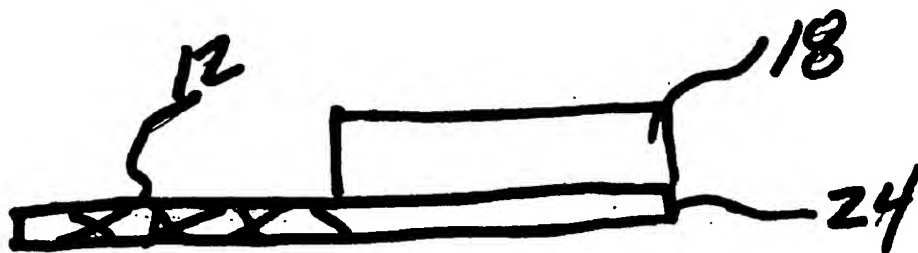


FIG 4

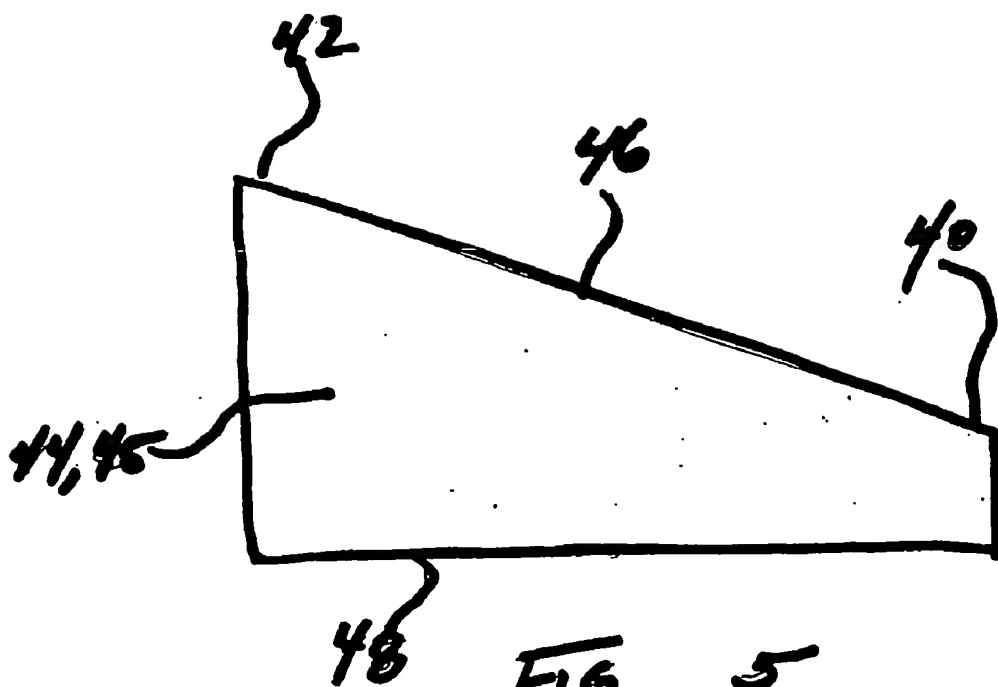
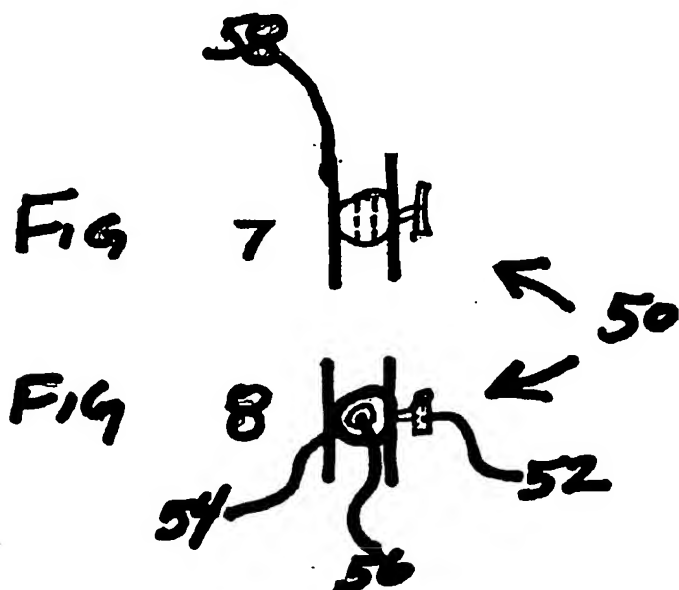
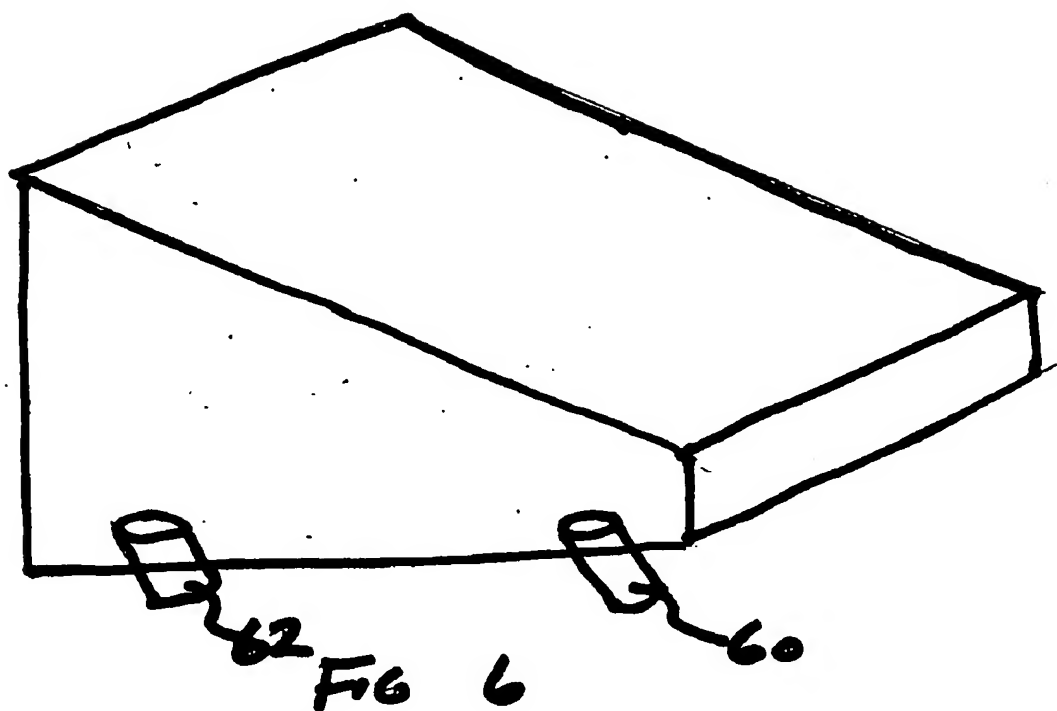


FIG 5



SELF-CONTAINED AIR LIFTED SEAT APPARATUS

BACKGROUND OF THE INVENTION

[0001] A. Field of Invention

[0002] The present invention relates to the field of medical devices and, more specifically, to an inflatable device used to assist an invalid or physically disadvantaged person in moving from a seated position to a standing position.

[0003] B. Description of the Related Art

[0004] The impact of the aging population of the United States is well recognized and has profound socioeconomic implications, not the least of which is the conversion of nursing home care into a major industry. Also, not the least of the inevitable effects of aging is the loss of lean body (muscle) mass with the result of muscle weakness. There are several contributing factors involved in this loss. Loss of appetite, poor dentition, lack of exercise, dwindling blood supply (particularly to the lower extremities) and down regulation of metabolism are all conspirators in this process. While these factors can be offset by improved nutrition and regulated exercise, the results are related to a maintained status quo rather than a return to physical vigor. Further loss may be forestalled but regeneration of lost muscle is dependent on synthesis of muscle protein and restoration of cellular activity. Both of these requisites are the victims of the aging process of muscle. The bottom line of this aspect of the aging process is that muscle weakness is the expected companion of the senior population.

[0005] Significant physical strength is not a prerequisite to a self-sufficient life style, but physical mobility is, and a level of muscle strength is a requirement for mobility. A consistent feature of early impairment of mobility is difficulty in getting up from a chair. Weakness of the extensors of the knee (the quadriceps femoris) results in difficulty rising from a chair, stair climbing and even walking. Limitations in those functions contribute to further activity restrictions which in turn result in progressive muscle weakness. Progressive limitations of physical activity complete a cycle of physical deterioration and diminishing lifestyle.

[0006] The preservation of mobility is thus the key to the maintenance of a useful, independent and psychologically fulfilling lifestyle. To that end the use of a device that permits the capability of rising from a chair and allowing walking is offered as a practical solution to the problem of physical imprisonment by the inability to move independently.

[0007] Various types of devices have been proposed to address this problem such as U.S. Pat. Nos. 3,479,087 to Burke, 5,375,910 to Murphy and 5,505,518 to Pike. These patents all disclose a pneumatic powered seat erector that consists of an upper and lower plate hinged together at one end. The devices also include an inflatable bladder positioned between the plates. As the bladder inflates, the plates begin to separate at the edge opposite the hinge causing the upper plate to pivot forward—thereby raising the individual from a seated position to a standing position. All three patents do not mimic the initial movement of the seated individual as he or she begins stand. At inflation, the upper plate pivots forward so that the individual is lifted only from

the back and not from the front. This pivot only action causes the individual to slide off the seat.

[0008] U.S. Pat. No. 4,629,162 to Porché discloses a portable pneumatic lift that includes an inflatable single chamber air bag, a pressurized air source and a remote control for operation of the air source. The air bag is wedged shape in that when inflated the height at the back of the air bag is about 13 inches and the height at the front of the air bag is about 10 inches. Although inflation of the air bag in Porché better mimics the initial movement of a seated individual as he or she begins to stand, the angle of pitch is not sufficient to fully assist the individual to stand from a seated position.

[0009] U.S. Pat. No. 4,905,329 to Heilner discloses an inflatable seat cushion consisting of an inflatable ring whereby the front portion of the ring is restricted during inflation thereby allowing the back portion of the ring to inflate at a height 3-7 times that of the front portion. Although Heilner allows for some elevation in the front portion, the inflatable ring must be sized appropriately to prevent an individual from falling through the center of the ring.

[0010] U.S. Pat. Nos. 5,361,433 and 5,742,957, both to Vanzant, disclose an inflatable bag having multiple cavities that inflate sequentially. The devices of these patents, however, do not provide a means for a washable fabric cover or the ability to place the compressor within a pocket or compartment on either side of the bladder.

[0011] What is needed is a device that elevates and pitches forward the seated individual, which mimics the change to a standing position. This will facilitate the effective contraction of quadriceps muscles by reducing the extent of muscle shortening necessary to allow straightening of the legs at the knee. As the present invention discloses, a forward pitch level of approximately thirty degrees is sufficient to produce the desired effect. This degree of inclination can be achieved by an approximate seven inch elevation of the dorsal plane of the seated position over the ventral plane. This effect can be accentuated by a two inch elevation of the seat cushion itself. The positional change produced by this device thus mimics the initial movements of the unassisted rise from a seated position in a normal circumstance. Therefore, performance of the initial movement by the device allows the completion of the standing process by the user. In this way the disadvantages known in the art can be overcome in a way that is better, more efficient and that provides better overall results.

SUMMARY OF THE INVENTION

[0012] The present invention overcomes the aforementioned disadvantages by providing an inflatable device that produces a forward pitch level of approximately 30 degrees that is sufficient to produce the desired effect. In addition, the degree of inclination can be achieved by an approximate 7 inch elevation of the dorsal plane of the seated position over the ventral plane. This effect can be accentuated by a 2 inch elevation of the seat cushion itself. The positional change produced by this device thus mimics the initial movements of the unassisted rise from a seated position in a normal circumstance. Therefore, performance of the initial movement by the device allows the completion of the standing process by the user.

[0013] It is therefore one object of the present invention to provide an inflatable lift device that mimics the initial movement of a seated person to a standing position.

[0014] It is another object of the present invention to provide an inflatable lift device where the front portion rises to assist the seated person to a standing position.

[0015] It is yet another object of the present invention to provide an inflatable lift device that is portable and lightweight.

[0016] It is yet another object of the present invention to provide an inflatable lift device with one embodiment that contains a single valve for inflation and rapid deflation.

[0017] It is yet another object of the present invention to provide an inflatable lift device that provides a removable washable cover.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention may take physical form in certain parts and arrangement of parts, a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof and wherein:

[0019] FIG. 1 is a perspective view of the present invention showing the bladder with the cover removed.

[0020] FIG. 2 is a perspective view of the bladder with the cover attached.

[0021] FIG. 3 is a top view of the support plate.

[0022] FIG. 4 is a side view of the base showing the location of the compressor compartment.

[0023] FIG. 5 is a side view of the inflatable bladder.

[0024] FIG. 6 is a perspective view of the inflated bladder showing one embodiment with separate intake and exhaust valves.

[0025] FIG. 7 illustrates the exhaust valve in the closed position.

[0026] FIG. 8 illustrates the exhaust valve in the opened position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0027] Referring now to the drawings wherein the showings are for purposes of illustrating a preferred embodiment of the invention only and not for purposes of limiting the same, FIGS. 1 and 2 show an air lift seat apparatus 10 that includes a base 12, a bladder 14, an intake/exhaust valve 16, a pocket or compartment 18, a self-contained air compressor 20 and a removable cover 22 (FIG. 2). The base 12 is preferably made of a rigid polystyrene material to provide stability to the apparatus when placed on a chair. The base 12 has a front 24, a back 26 and two sides 28, 29 and is preferably about 18 inches wide, 18 inches deep and 1 inch in height. However, the base 12 can be any suitable size to fit a standard sized chair, seat cushion of a sofa or similar type of sitting apparatus as along as chosen with sound engineering judgment.

[0028] Referring now to FIGS. 2 and 3, in the preferred embodiment a connecting means 27 is provided to selectively attach the cover 22 to the base 12. The connecting means 27 may be of any type chosen with sound engineering

judgment such as snaps 30, hook and loop fasteners such as Velcro® (not shown) or a zipper (not shown). The cover 22 can be made of any material chosen with sound engineering judgment but preferably is formed of a washable fabric. In the preferred embodiment, a slip prevention material 38 is provided on at least a portion of the top 23 of the cover 22. This slip prevention material 38 makes it difficult for a person to slip off of the lift seat apparatus 10 while the bladder 14 is inflating. The cover 22 is preferably sized slightly larger than the bladder 14 when the bladder 14 is fully inflated to facilitate easy application and removal of the cover 22.

[0029] With reference now to FIGS. 3 and 4, the compartment 18 that holds or houses the air compressor 20 can be located on either side of the bladder 14 to facilitate use by either hand of the seated person. The compartment 18 is preferably attached to either side 28, 29 of the base 12 and is located near the front 24 of the base as shown in FIG. 3. The compartment 18 can either be an integral part of the base 12 or can be a separate piece that attaches to the base 12 by any means chosen with sound engineering judgment. The preferred height of the compartment 18 is approximately 2 inches. The length and the width of the compartment 18 are determined by the type of air compressor used to inflate the bladder 14. The preferred air compressor 20 is a portable, commercially available, rechargeable type compressor commonly known in the art and thus will not be described further. An air hose 32 is provided to transport air from the air compressor 20 to the bladder 14. As shown in FIG. 1, the first end 34 of the hose 32 is connected to the air-compressor 20 and the second end 36 of the hose 32 is connected to the intake/exhaust valve 16 by means commonly known in the art.

[0030] Referring to FIGS. 1 and 5, the bladder 14 is preferably made from a single piece of material. The material can be any type of flexible material chosen with sound engineering judgment that allows the bladder 14 to expand upon inflation and contract upon deflation. The bladder 14 further contains a front portion 40, a rear portion 42, two trapezoidal shaped side panels 44, 45, a top 46 and a bottom 48. The length and width of the bottom 50 are similarly sized to fit the base 12 as described above. The bladder 14 is designed to mimic the initial movements of a seated person when that person begins to stand. Therefore, when the bladder 14 begins to inflate the front portion 40 and the rear portion 42 will inflate simultaneously. When fully inflated, the rear portion 42 is at least three times higher than the front portion 40. In one embodiment the rear portion 42 is nine inches high and the front 40 portion is 2 inches high.

[0031] With reference now to FIG. 1, an intake/exhaust valve 16 is located on the side 44 of the bladder. The valve can be located on either side 44, 45 to facilitate use by either hand of the seated person as with the compartment 18 as described above. The valve 16 can be any type of mechanical valve commonly known in the art. In one embodiment the valve 16 is a ball type valve 50 as shown in FIGS. 7 and 8. The ball valve 50 further consists of a handle 52, a core 54 and an aperture 56 and a housing 58. FIG. 7 shows the ball valve 50 in the open position. When the ball valve 50 is in the open position the aperture 56 is parallel to the housing 58 and air can enter or escape from the bladder 14. FIG. 8 shows the ball valve 50 in the closed position. When the ball valve 50 is in the closed position the aperture 56 is perpendicular to the housing 58 and air cannot enter into or escape from the bladder 14. Another embodiment of the present invention is shown in FIG. 6. In this embodiment the

apparatus contains two valves. The first valve 60 is the intake valve and the second valve 62 is the exhaust valve. In this embodiment, the hose 32 connects the air compressor 20 to the intake valve 60. The exhaust valve 62, when opened, permits air to exit the bladder to the atmosphere. As a result, the bladder can be deflated without removal of the air compressor hose 32.

[0032] Operation of the present invention will now be described. The air lift seat apparatus 10 can be used to assist a person in moving from a standing position to a seated position and from a seated position to a standing position. To move from a seated position to a standing position, the person simply turns the handle 52 on the ball valve 50 and rotates it 90 degrees until the aperture 56 is parallel to the housing 58. The person then activates the air compressor 20 thus allowing air to enter the bladder 14. As the bladder 14 begins to inflate the front portion 40 and the rear portion 42 begin to rise simultaneously thereby slowly lifting the seated person. As the front portion 40 reaches its maximum height as described above, the rear portion 42 will continue to inflate thereby creating a pitch angle. As the rear portion 42 continues to inflate, the seated person is further lifted until the rear portion 42 reaches its maximum height as described above thereby gently assisting the seated person to a standing position. Conversely, in assisting a person to move from a standing position to a seated position, the person simply inflates the bladder 14 as previously described. Once the bladder 14 is fully inflated the person deactivates the air compressor 20. The person then rotates the ball valve 50 by 90 degrees until the aperture 56 is perpendicular to the housing 58. This will prevent air from escaping from the bladder 14 until the person is ready to be seated. The person then backs into the apparatus 10 and places his/her weight onto the cover 22 that is positioned over the bladder 14. Once the person is leaning against the apparatus 10, the person then rotates the ball valve 50 by 90 degrees until the aperture 56 is parallel to the housing 58 thereby permitting the air to escape from the bladder 14 thus gently assisting the person to move from a standing position to a seated position.

[0033] The preferred embodiments have been described, hereinabove. It will be apparent to those skilled in the art that the above methods may incorporate changes and modifications without departing from the general scope of this invention. It is intended to include all such modifications and alterations in so far as they come within the scope of the appended claims or the equivalents thereof.

Having thus described the invention, it is now claimed:

1. A portable air lifted seat apparatus comprising:
 - a rigid base;
 - a one-piece inflatable bladder positioned on the base comprising:
 - (i) a front portion;
 - (ii) a rear portion;
 - (iii) first and second trapezoidal shaped side panels operatively connecting the front and rear portion;
 - (iv) wherein when the bladder is inflated the rear portion is at least three times the height of the front portion;
 - a valve for inflation and deflation of the bladder, the valve operatively connected to one of the first and second side panels of the bladder;

- a compartment located at one of the first and second side panels of the bladder and operatively connected to the base;

- a rechargeable, self-contained air compressor for use in inflating the bladder, the air compressor positioned in the compartment;

- a hose having first and second ends, wherein the hose is operatively connected to an output of the compressor at the first end and to the valve at the second end; and,

- a cover positioned over the bladder and operatively connected to the base.

2. The portable air lifted seat apparatus of claim 1, wherein the front portion initially rises in unison with the rear portion.

3. The portable air lifted seat apparatus of claim 2, wherein the rear portion is approximately 7 inches higher than the front portion at full inflation.

4. The portable air lifted seat apparatus of claim 1, wherein the cover comprises:
 - a selectively removable connecting means so that the cover may be removed from the base and the bladder.

5. The portable air lifted seat apparatus of claim 4, wherein the top of the cover further contains material to minimize slippage.

6. A portable air lifted seat apparatus comprising:
 - a rigid base;

- a one-piece inflatable bladder positioned on the base comprising:
 - (i) a front portion;
 - (ii) a rear portion;
 - (iii) first and second trapezoidal shaped side panels operatively connecting the front and rear portion;
 - (iv) wherein when the bladder is inflated the rear portion is at least three times the height of the front portion;

- a first valve for inflation of the bladder operatively connected to one of the first and second side panels of the bladder;

- a second valve for deflation of the bladder operatively connected to one of the first and second side panels of the bladder;

- a compartment located at one of the first and second side panels of the bladder and operatively connected to the base;

- a rechargeable, self-contained air compressor for use in inflating the bladder, the air compressor positioned in the compartment;

- a hose having first and second ends, wherein the hose is operatively connected to an output of the compressor at the first end and to the first valve at the second end; and,

- a cover positioned over the bladder and operatively connected to the base.

* * * * *



US005361433A

United States Patent [19][11] **Patent Number:** **5,361,433****Vanzant**[45] **Date of Patent:** **Nov. 8, 1994**

[54] **PNEUMATIC SIT/STAND ASSISTANCE
DEVICE UTILIZING SEQUENTIAL
INFLATION FOR STABILIZING EFFECTS**

*Primary Examiner—Alexander Grosz
Attorney, Agent, or Firm—Gambrell, Wilson &
Hamilton*

[76] **Inventor:** **B. W. Vanzant, 7743 Pimlico,
Boerne, Tex. 78006**

[57] **ABSTRACT**

[21] **Appl. No.:** **65,561**

[22] **Filed:** **May 21, 1993**

[51] **Int. Cl.⁵** **A47C 7/00**

[52] **U.S. Cl.** **5/81.1; 5/654;
254/93 HP; 297/DIG. 3; 297/DIG. 10**

[58] **Field of Search** **5/81.1, 654, 453, 454,
5/455, 450; 297/DIG. 10, 485, DIG. 3; 254/93
HP**

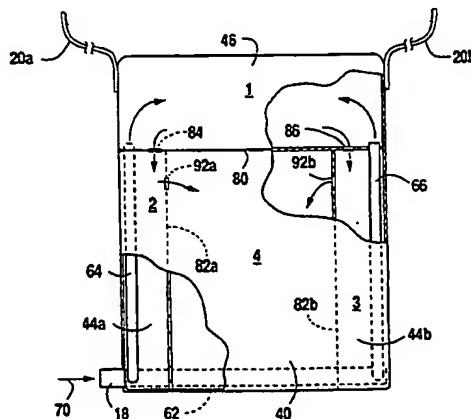
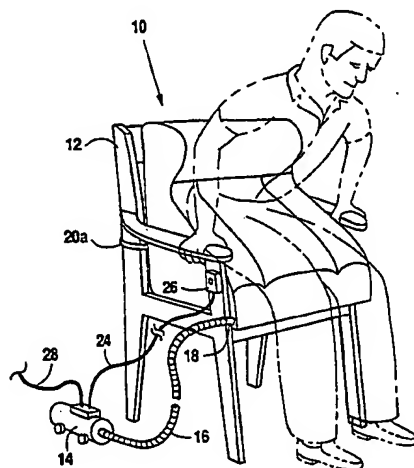
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A pneumatic sit/stand device which is preferably used in assisting an invalid or physically disadvantaged person in rising from, or being seated in, a chair. The sit/stand device includes an inflatable bag having two or more cavities which inflate sequentially to help stabilize the person as he is raised from or lowered into a chair. Rear and side wall cavities inflate first to provide stabilization and push the person forward so that his feet contact the floor. A center cavity then inflates to lift and thrust the person into a standing position. The side walls help prevent the person from tilting or leaning from one side to another as air pressure equalizes the bag. The device can be used alone by the physically disadvantaged person or in conjunction with an attendant whose duty is to assist the person in sitting or standing.

19 Claims, 4 Drawing Sheets



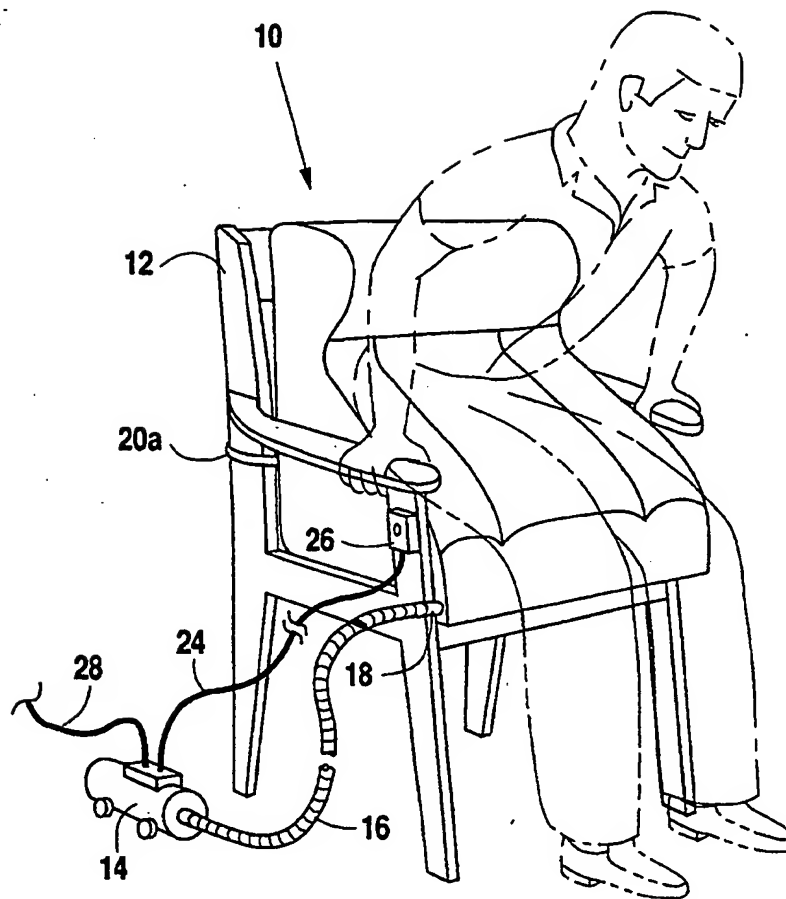


Fig. 1

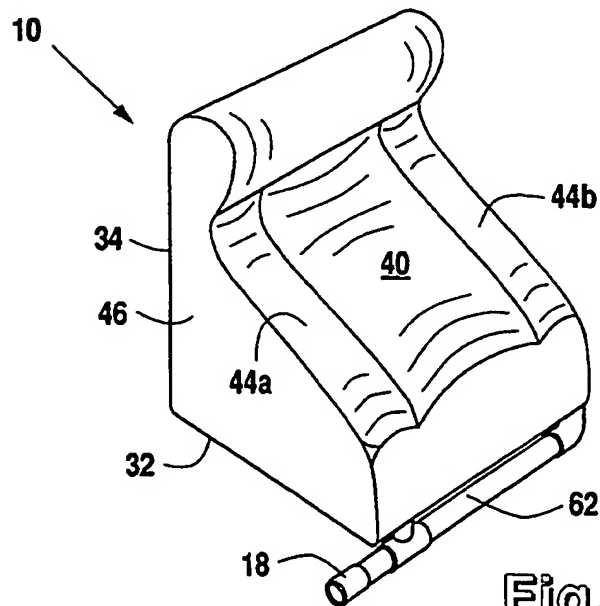


Fig. 2

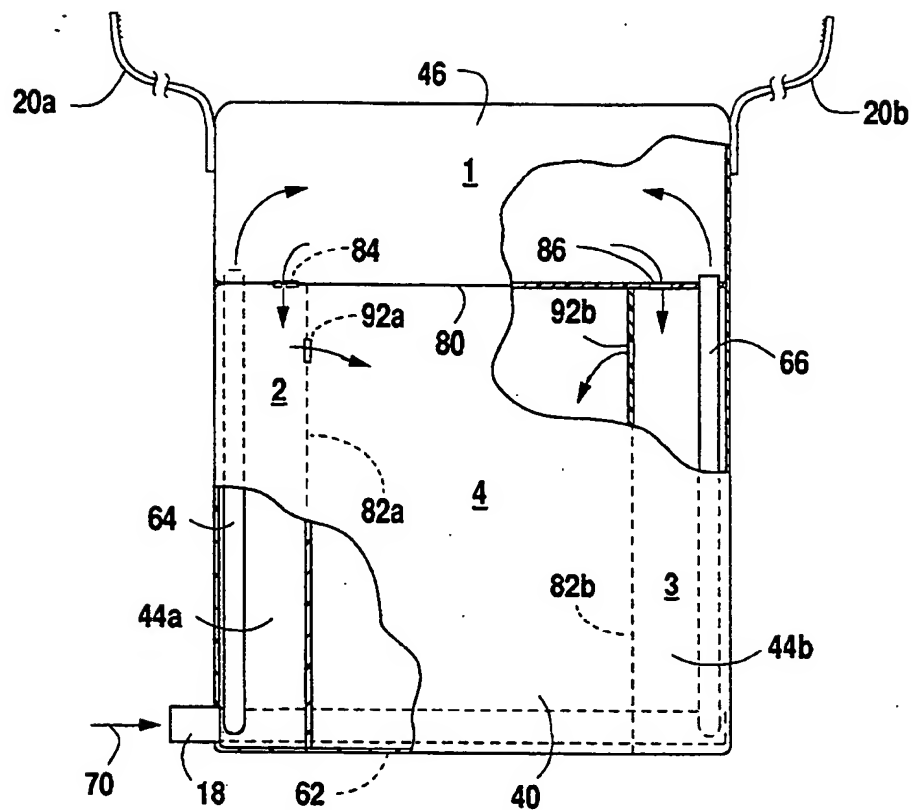


Fig. 3

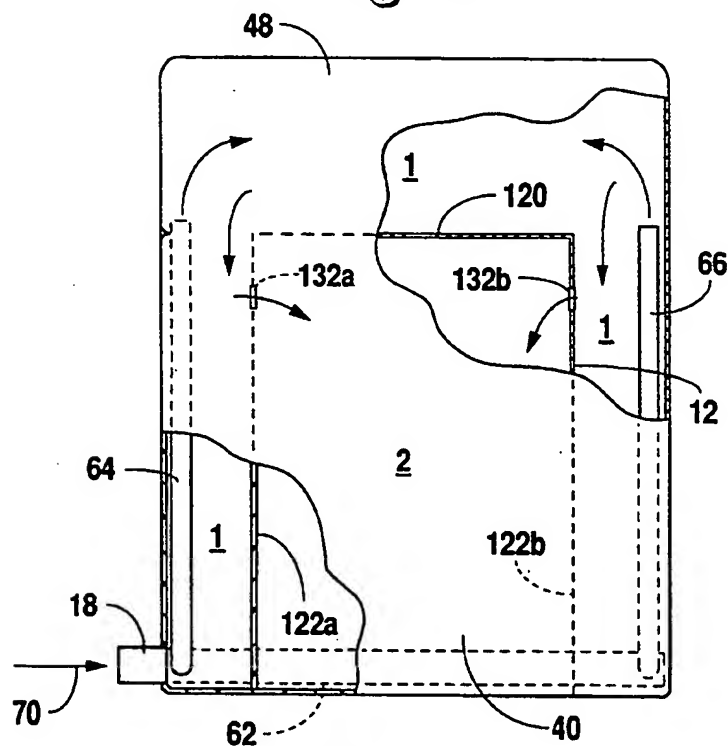


Fig. 4

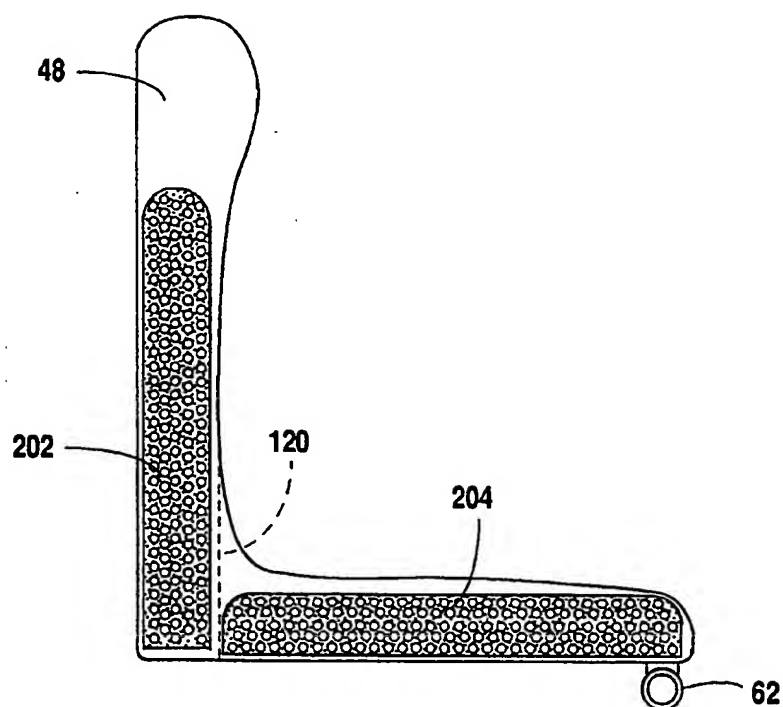


Fig. 5a

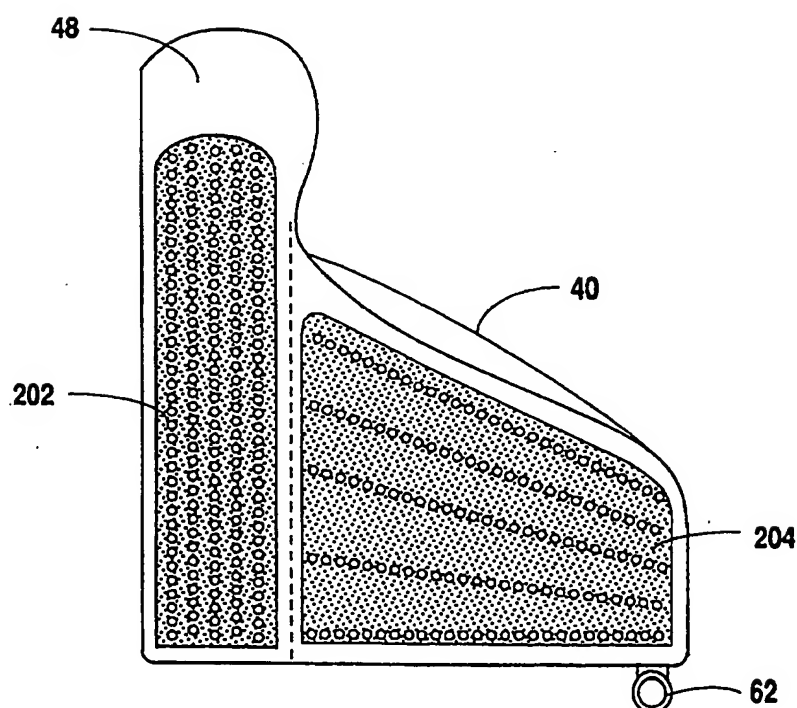


Fig. 5b

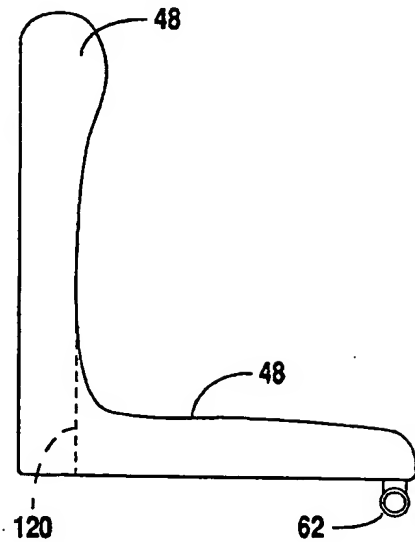


Fig. 6a

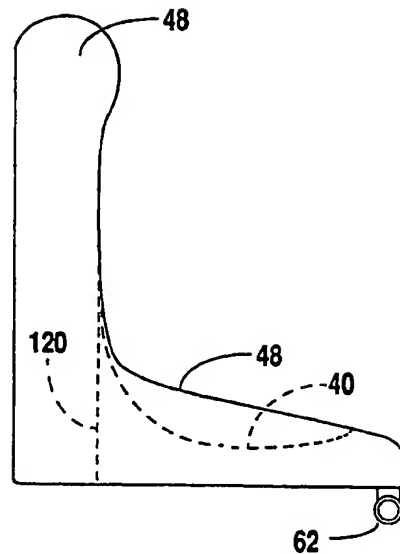


Fig. 6b

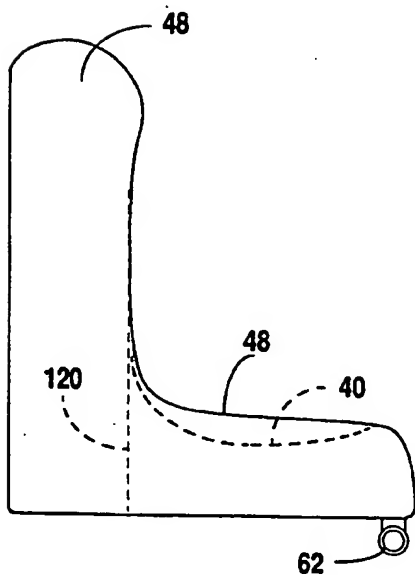


Fig. 6c

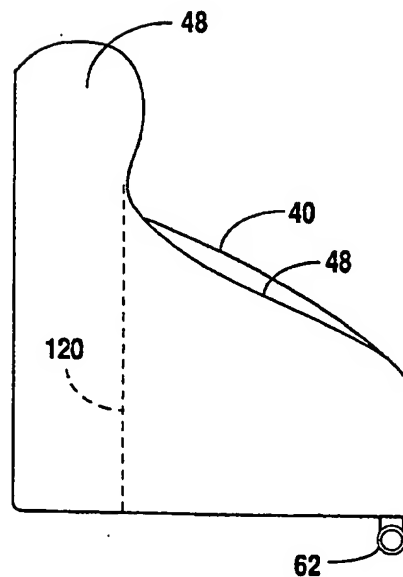


Fig. 6d

PNEUMATIC SIT/STAND ASSISTANCE DEVICE UTILIZING SEQUENTIAL INFLATION FOR STABILIZING EFFECTS

SPECIFICATION

1. Field of the Invention

The present invention relates generally to an apparatus for use in assisting an invalid or physically disadvantaged person in moving to or from a seated position, and more specifically to a pneumatic sit/stand device using an inflatable bag having cavities which inflate sequentially to provide a stabilizing effect.

2. Description of the Related Art

Elderly, invalid, and otherwise physically disadvantaged persons often encounter difficulty in raising themselves from or lowering themselves into a chair. The problem of arising from or sitting in a chair is particularly acute with elderly, invalid or obese persons having weakened arm muscles, and assistance is often required to permit them to rise or sit down. In many instances, the cumulative effect is to bruise the arms of the person being assisted in addition to causing physical and mental discomfort to the person assisting, if such person is available. In cases where no personal assistance is available, mechanical, hydraulic or pneumatic sit/stand devices have been developed. In general, these devices are heavy, and once positioned remain stationary.

One type of sit/stand device uses an inflatable bag to raise or lower the person. The inflatable bag type of sit/stand device is particularly advantageous in that it is lightweight, and may be simply constructed of durable, inexpensive materials. Thus, an inflatable bag may be conveniently transported and placed in a chair to help lift a person from the chair. For example, U.S. Pat. No. 3,346,885, issued Oct. 17, 1967 to Merriman describes an inflatable bag used to raise or lower a person from a bathtub.

U.S. Pat. No. 4,629,162 to Porche discloses an inflatable bag apparatus for enabling an invalid or physically handicapped person to rise from or lower into a chair. This lift uses a bag that is wedge-shaped so that inflation of the bag lifts and thrusts the person forward. However, a limitation of this device and method is that the entire bag is inflated at one time, and nothing is provided to stabilize the person and prevent the person from falling to either side. As the person is lifted out of the chair, nothing is provided to ensure that the person does not tilt backwards or lean to one side as air pressure equalizes the bag. In addition, the person is lifted upward prior to being pushed forward to an extent where his feet touch the ground. If the person being lifted is unsteady or lacking in balance, the person may fall to one side or the other, possibly with accompanying injury. Therefore, an improved sit/stand device is desired which stabilizes the person as the person is being raised from or lowered into a chair.

SUMMARY OF THE INVENTION

The present invention comprises a pneumatic sit/stand device which is preferably used in assisting an invalid or physically disadvantaged person in rising from, or being seated in, a chair. The sit/stand device of the present invention comprises an inflatable bag which has an improved design to provide thrusting and lifting forces sequentially in order to help prevent the person

from tilting or leaning from one side to another as air pressure equalizes the bag.

In a first embodiment comprising two internal cavities, the sit/stand device includes a center cavity where the person is seated and an outer cavity. The outer cavity is comprised of side wall portions on either side of the center cavity and a rear portion that provides back support to the person being seated or lifted. An air supply assembly is included comprising an air inlet, tubes, inner partitions, and orifices. The inner partitions are included in the device to form the outside and center cavities. The inlet receives air from a source, and the tubes, partitions, and orifices distribute this air to the outer cavity and then to the center cavity. As the bag is inflated, the side wall portions of the outer cavity inflate to provide sideways stability; the rear portion of the outer cavity provides a thrusting force outward (or forward) which also aids the person in standing; while the center cavity provides a lifting force which helps the person stand. This combination of lifting and thrusting better enables a person to rise from or lower into a chair.

Inner partitions having orifices are configured to form the outer and center cavities and distribute the air from the outer cavity to the center cavity. In this embodiment, a first interior partition divides the rear portion of the outer cavity from the center cavity, and second and third interior partitions divide the side wall portions of the outer cavity from the center cavity. The second and third inner partitions each have an orifice between the respective side wall portion of the outer cavity and the center cavity. Air flow is unrestricted between the rear and side wall portions of the outer cavity, and the orifices allow restricted air flow between the outer cavity and the center cavity. Thus, as the device is inflated, the air flows from the side wall portions of the outer cavity to the center cavity, inflating the rear and side wall portions of the outer cavity before the center cavity is inflated. This sequential inflation provides a stabilizing effect.

Alternatively, in an arrangement having four internal cavities, the device is configured having a rear cavity, side wall cavities, and a center cavity. The air supply assembly directs air first to the rear cavity, then to the side wall cavities and finally to the center cavity. This causes the device to inflate generally according to the sequence: rear cavity, side wall cavities, center cavity. In this manner, the rear and side wall cavities inflate first to provide stability to the person before the majority of the center cavity has been inflated, i.e. before a majority of the lifting force has been applied. Another embodiment includes open cell foam pads placed in the outer cavity to provide additional lifting force in addition to decreasing the volume of air needed.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention can be obtained when the following detailed description of the preferred embodiment is considered in conjunction with the following drawings, in which:

FIG. 1 depicts the sit/stand device of the present invention being used to help a person stand up from a chair;

FIG. 2 illustrates the sit/stand device fully inflated;

FIG. 3 is a top view of the sit/stand device illustrating air flow according to one embodiment of the invention;

FIG. 4 is a top view of the sit/stand device illustrating air flow according to the preferred embodiment of the invention;

FIGS. 5a and 5b are a side view of the sit/stand device illustrating an alternative embodiment utilizing open cell foam pads; and

FIGS. 6a-6d are perspective views of the sit/stand device alone in various stages of inflation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the sit/stand device 10 of the present invention is shown being used to lift a person out of a chair 12. It is noted that the sit/stand device 10 of the present invention can be used to either lift a person from a chair or lower a person into a chair. In the following description, the sit/stand device 10 is primarily described as being used in raising a person from a chair. The sit/stand device 10 is intended for elderly, handicapped, obese, invalid or otherwise physically disadvantaged persons who encounter difficulty in rising from or lowering themselves into a chair. The sit/stand device 10 can also be used by people who assist such disadvantaged persons by pulling under their arms, pushing on their backs, etc.

The sit/stand device 10 rests on the seat of the chair 12 and against the back of the chair 12 and is secured to the back of the chair 12 with two straps 20a and 20b (strap 20b not shown). The sit/stand device 10 includes an air supply assembly which includes an air inlet 18 located on the side of the sit/stand device 10 toward the front and below the sitting surface of the chair 12. The air inlet 18 is coupled to an air supply 14 via a hose 16. The air supply 14 is preferably a standard type air inflation device. The air supply 14 also includes a cord 24 connected to a power button 26 on the chair 12 and another cord 28 connected to an electrical outlet (not shown). The power button 26 is used to energize the air supply 14 and is preferably placed near an arm of the chair 12 for ready access by a person in the chair 12.

With reference to FIG. 2, the sit/stand device 10 is shown by itself and inflated. In one embodiment, the device 10 has a manifold 62 which hangs over the edge of the chair 12 (FIG. 1) when the bottom 32 of the device 10 is placed in the chair seat and the back 34 of the device 10 is placed against the chair back. The manifold 62 is used to distribute incoming air from inlet 18 at an equal rate into both side wall cavities 44a and 44b. In addition to providing air into the device 10, as discussed below, the manifold 62 is provided on the front of the device 10 to position the device 10 relative to the front of the chair 12 as well as ensure that the device 10 is spread across the chair 12 when the device 10 is first placed in the chair 12. This prevents the device 10 from beginning an initial cycle at an improper position in the chair. Also the manifold 62, along with the straps 20a and 20b (FIG. 1), help to ensure that the device remains in a functional, inflatable position on the chair 12 during sustained use.

The sit/stand device 10 comprises an inflatable bag 60 that is partitioned into separate cavities. The number and arrangement of the various cavities are discussed below with regard to FIGS. 3 and 4. In a four cavity embodiment, as shown in FIG. 3, the device 10 includes a center cavity 40, side wall cavities 44a and 44b, and a rear cavity 46. In the preferred embodiment, which has two internal cavities, the rear and side wall portions comprise a single outside cavity which is separate from

the center cavity 40, as shown in FIG. 4. As described below, these cavities inflate sequentially to provide stabilization and support as the person is being raised from, or lowered into, a chair. The inflatable bag is preferably made of Regency 70 Denier Nylon.

Referring again to FIGS. 3 and 4, top views of the sit/stand device illustrating the internal components and air distribution according to two different embodiments are shown. In each embodiment, various inner partitions are arranged in the bag to form the cavities. The air inlet 18, tubes and various inner partitions having orifices, which form the air supply assembly, distribute air according to a predetermined sequence.

Air distribution in the bag is preferably such that a person using the device is stable and does not tilt or lean from side to side (wobble) as air pressure equalizes in the bag. Thus, air enters on both sides to provide level rising characteristics. The rear and side wall portions of the bag preferably fill first to provide firmness and stability around the person's buttocks and legs. To accomplish this, the center cavity may be an island with outer cavities(y) completely surrounding it (not shown), or it may be a peninsula extending inward from the front of the bag as illustrated in FIGS. 3 and 4. It may also be desirable to have the center cavity shaped as a pocket, but it must rise sufficiently to push the user up to about 20°-30° from the vertical so that he will be able to lean forward and stand. It is important that the person provide his own impetus to achieve a standing position.

Referring now to the four cavity embodiment in FIG. 3, the device 10 includes an air supply assembly which in this embodiment includes the external inlet 18, external manifold 62, and internal tubes 64 and 66 which direct air 70 to the rear cavity 46 of the device 10. The rear cavity 46 is divided from the center cavity 40 and the side wall cavities 44a and 44b by an inner partition 80. Each side wall cavity 44a and 44b is divided from the center cavity 40 by respective inner partitions 82a and 82b. Inner partition 80 has first and second orifices 84 and 86 between the rear cavity 46 and the side wall cavities 44a and 44b. Inner partitions 82a and 82b each have an orifice 92a and 92b between the side wall cavities 44a and 44b and center cavity 40. In this embodiment, the orifices 92a and 92b are located toward the rear of the side wall cavities 44a and 44b. Alternatively, the orifices can be moved closer to the front of the side wall cavities 44a and 44b to alter the inflation of the side wall cavities 44a and 44b relative to the rear cavity 46. The inner partitions 80, 82a and 82b are preferably made of the same material as the outer material of the bag comprising the device 10.

The rear cavity 46, side wall cavities 44a and 44b, and center cavity 40 are labeled 1 through 4, respectively as shown in FIG. 3, and the device inflates generally according to the sequence 1→2,3→4. The tubes 64 and 66 provide the air directly to the rear cavity 46, and thus the rear cavity 46 begins to inflate first. The side wall cavities 44a and 44b, labeled 2 and 3, begin to inflate soon after the rear cavity 46 begins to inflate. The side wall cavities 44a and 44b inflate virtually simultaneously. Finally, the center cavity 40 begins to inflate.

FIG. 4 is a top view of the sit/stand device depicting an alternative and preferred arrangement of the air bag. This embodiment comprises an outer cavity 48 including rear and side wall portions and a center cavity 40 forming the center section. As in the previously described embodiment, the device 10 depicted here has an air supply assembly which includes the external inlet 18,

external manifold 62 and internal tubes 64 and 66 which direct air 70 to the rear of the device 10. The rear portion of the outer cavity 48 is divided from the center cavity 40 by an inner partition 120. The side wall portions of the outer cavity 48 are divided from the center cavity 40 by inner partitions 122a and 122b which are in reality extensions of inner partition 120. Center or inner cavity 40 is defined by the inner partitions 120, 122a and 122b. Inner partitions 122a and 122b each have an orifice 132a and 132b, respectively, between the side wall portions of the outer cavity 48 and the center cavity 40. The two orifices 132a and 132b in FIG. 4 correspond to the orifices 92a and 92b in FIG. 3.

FIG. 4 also shows details of the air flow path during inflation of the device in this embodiment. Air 70 enters the air supply assembly inlet 18 and is directed through the external manifold 62 and inner tubes 64 and 66 into the rear portion of outer cavity 48. The air then passes through the orifices 132a and 132b into the center cavity 40. The outer cavity 48 and center cavity 40 are labeled 1 and 2, respectively, and the device 10 inflates according to the sequence 1→2. The person sitting on top of the center cavity 40 helps ensure that the outer cavity 48, rear portion and both side wall portions inflate first.

FIGS. 6a-6d illustrate inflation of the device 10 according to the embodiment of FIG. 4. With reference to FIG. 6a, the sit/stand device 10 is shown by itself completely deflated. In FIG. 6b, the device is shown partly inflated. In the partly inflated condition, the side wall portions of the outer cavity 48 are more inflated than the center cavity 40. This tends to prevent a person (not shown) sitting on the center cavity 40 from moving sideways. Also, the upper rear portion of the outer cavity 48 is somewhat more inflated, which acts to push the person forward. The center cavity 40 is outlined by the dashed lines and inner partition 120.

In FIG. 6c, the sit/stand device 10 is shown further inflated. In the further inflated condition, the rear portion of the outer cavity 48 is further inflated providing further forward thrusting of the person (not shown) sitting on the center cavity 40. The side wall portions of the outer cavity 48 are also further inflated. The center cavity 40 by now has begun to inflate to elevate the person from the chair 12. In this further inflated condition, the side wall portions prevent sideward movement of the person sitting on the center cavity 40, and lifting action pushes the person upward. Also, the contoured form of the center cavity 40 serves to push the persons forward to a standing position. Again, in FIG. 6c, the dashed lines indicate the form of the center cavity as defined by the top outside surface and the rear inner partition 120.

In the completely inflated state as shown in FIG. 6d, the upper rear portion of the outer cavity 48 has filled out the limits of its contour to form a convex shape with respect to the side wall portions. The center cavity 40 has fully inflated and is now above the previously inflated side wall portions of the outer cavity 48. In this state, the side wall portions are no longer above the center cavity 40 to restrain sideways movement of a person (not shown) on the center cavity 40. Also the center cavity 40 has inflated such that the rear of the center cavity 40 is now substantially higher than the front. This is due to the contour of the center cavity 40. Because the rear is above the front at this stage of inflation, additional forward thrusting is provided by the center cavity 40 in addition to its lifting action.

Referring now to FIGS. 5a and 5b, in an alternate embodiment the sit/stand device 10 includes open cell foam pads 202 and 204 in the outside cavity 48. The use of such internal material provides additional lifting force in addition to decreasing the volume of air needed for full inflation. This not only allows for lower volume of air, but also for lower pressures. Additionally, use of the open cell foam 202 and 204 in the rear and side portions of the external cavity 48 improves stability. FIG. 5a shows the device 10 in a collapsed state while FIG. 5b shows the device 10 in an inflated state.

In each of the above embodiments, to ensure that the user leans forward when using the device 10 to stand, the rear of the device 10 pushes the person forward somewhere close to the shoulder blades before beginning to lift him. For this reason, the device 10 begins to fill from the rear. This pushes the person forward to where his feet are touching the floor prior to any lifting force being applied. This provides further stability.

Thus, an improved sit/stand device is provided which provides stability to the person being lifted. The bag comprising the device is partitioned into two or more separate cavities which inflate sequentially. The rear and side walls of the device inflate first to bring the person's feet in contact with the floor and also prevent sideways movement. The center section begins inflation later after this stabilization has been provided to lift and thrust the person forward into a standing position.

The invention is intended to be limited only as defined in the claims. Additional objects, advantages, and novel features are set forth in the following description, or will be apparent to those skilled in the art or those practicing the invention. Other embodiments are within the spirit and scope of the invention. These objects and embodiments may be achieved by the combinations pointed out in the appended claims.

What is claimed:

1. An air operated inflatable, cushionlike sit/stand device for assisting physically disadvantaged persons in moving to or from a seated position, comprising:
 - a center cavity, wherein a person may be seated in the center cavity, and wherein the center cavity is capable of receiving air supplied thereto to lift the person upward a certain distance; and
 - an outer cavity connected to said center cavity and capable of receiving air supplied thereto to stabilize the person as the person is lifted.
2. The sit/stand device of claim 1, further comprising:
 - an air supply assembly connected to said center and outer cavities which directs air to said outer cavity prior to directing air to said center cavity, wherein said outer cavity inflates generally prior to said center cavity to stabilize the person rising from a seated position.
3. The sit/stand device of claim 2, further comprising:
 - a partition separating said center cavity and said outer cavity, wherein said partition includes an orifice allowing passage of air between said center and outer cavities; and
 - wherein said air supply directs air first to said outer cavity and said orifice distributes said air to said center cavity.
4. The sit/stand device according to claim 2, wherein the center cavity has front, rear, and opposite sides, and wherein the outer cavity comprises:
 - side wall portions located on each of the sides of the center cavity and capable of receiving air supplied thereto to retain the person within certain sideways

- limits of the center cavity during a portion of the lifting distance; and
- a rear portion connected to the rear of the center cavity and also connected to the side wall portions for supporting the person seated and capable of receiving air supplied thereto to thrust the person forward a certain distance.
5. The sit/stand device of claim 4, further comprising: a first partition separating said rear portion and said center cavity, and
- second and third partitions separating said side wall portions and said center cavity;
- wherein said first, second, and third partitions collectively include one or more orifices for distributing air between said center and outer cavities.
6. The sit/stand device of claim 1, further comprising an open cell foam pad comprised within said center cavity for providing additional lifting force and for decreasing the volume of air required for full inflation.
7. The sit/stand device of claim 1, further comprising an open cell foam pad comprised within said outer cavity for providing additional lifting force and for decreasing the volume of air required for full inflation.
8. The sit/stand device of claim 1, wherein said outer cavity thrusts the person forward while receiving air to allow the person's feet to touch the ground prior to the center cavity lifting the person upward.
9. The sit/stand device of claim 1,
- wherein the center cavity is capable of expelling air to lower a person a certain distance; and
- wherein the outer cavity is capable of expelling air to stabilize the person as the person is lowered.
10. The sit/stand device of claim 9,
- wherein said center cavity deflates prior to said outer cavity when a person is moving to a seated position to stabilize the person being seated.
11. An air operated sit/stand device for assisting physically disadvantaged persons in moving to or from a seated position, comprising:
- a center cavity adapted to sit in the seat of a chair, wherein a person may be seated in the center cavity and wherein the center cavity is capable of receiving air supplied thereto to lift the person upward a certain distance;
- a rear cavity connected to said center cavity and adapted to fit against the back of a chair and capable of receiving air supplied thereto for thrusting the person forward a certain distance;
- side wall cavities connected to said rear cavity and connected to opposite sides of said center cavity and capable of receiving air supplied thereto to stabilize the person as the person is lifted.
12. The sit/stand device of claim 11, further comprising:

- an air supply assembly coupled to said center, rear, and side wall cavities which directs air to said rear and side wall cavities prior to directing air to said center cavity, wherein said rear and side wall cavities inflate generally prior to said center cavity to stabilize the person rising from a seated position.
13. The sit/stand device of claim 11, further comprising:
- a plurality of partitions separating said center, rear, and side wall cavities, wherein one or more of said partitions include an orifice allowing passage of air between said rear, side wall, and center cavities; and
- wherein said air supply assembly directs air first to said rear and side wall cavities and said orifice distributes said air to said center cavity.
14. The sit/stand device of claim 11, further comprising an open cell foam pad comprised within said center cavity for providing additional lifting force and for decreasing the volume of air required for full inflation.
15. The sit/stand device of claim 11, further comprising an open cell foam pad comprised within said rear cavity for providing additional stability and lifting force and for decreasing the volume of air required for full inflation.
16. An air operated sit/stand device comprising:
- an inflatable bag adapted for a person to sit on having a plurality of cavities, and capable of receiving air supplied thereto for raising the person a certain distance;
- an air supply assembly which provides air to sequentially to said cavities thereby retaining the person on the device and thrusting the person forward before lifting the person upward.
17. An air operated sit/stand device comprising:
- an inflatable bag adapted to sit in the seat of a chair and capable of receiving air supplied thereto for raising a person seat in the chair a certain distance, wherein said inflatable bag includes a front which is positioned near the front of the chair and a rear which is positioned near the rear of the chair;
- an air supply assembly which provides air sequentially to said inflatable bag; and
- a retainer connected to the front of the inflatable bag for positioning the front of the inflatable bag against the front of the chair wherein said retainer is a manifold which receives air from said air supply assembly and distributes said air to said inflatable bag.
18. The air operated sit/stand device of claim 17, wherein said retainer prevents movement of the inflatable bag in the chair.
19. The air operated sit/stand device of claim 17, wherein said retainer is rigid and maintains the inflatable bag properly spread across the front of the chair.
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US006113188A

United States Patent [19]

Stewart et al.

[11] **Patent Number:** **6,113,188**[45] **Date of Patent:** **Sep. 5, 2000**[54] **PORTABLE SEATING ASSIST DEVICE**

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[21] **Appl. No.:** 08/997,948[22] **Filed:** Dec. 24, 1997[51] **Int. Cl.⁷** A47C 1/022[52] **U.S. Cl.** 297/339; 297/DIG. 3;
297/DIG. 8; 297/DIG. 10; 297/344.16[58] **Field of Search** 297/338, 339,
297/313, DIG. 3, DIG. 8, DIG. 10, 344.15,
344.16; 248/421, 631; 108/95

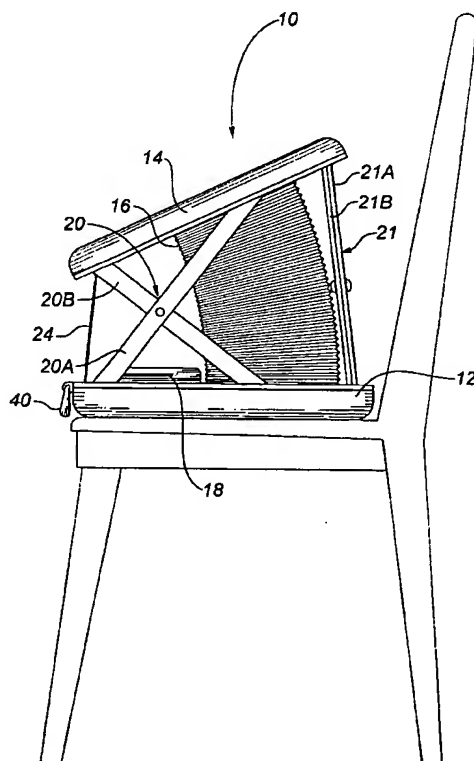
Primary Examiner—Anthony D. Barfield
Attorney, Agent, or Firm—Bennett Jones

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[57] **ABSTRACT**

A portable device is provided for assisting persons with the acts of sitting down and rising from a seated position. The device comprises a base a seat, an inflatable air chamber and a battery powered air compressor. The air chamber, the compressor and the battery are self-contained within the base and seat, which fit together to form a case. The device further comprises three stabilizing scissor-braces which support and stabilize the side edges and the rear edge of the seat throughout its range of travel. The air chamber is preferably fashioned of non-stretch material. The device may also include a cable and spring mechanism to urge the seat into a closed position from a raised open position.

5 Claims, 3 Drawing Sheets

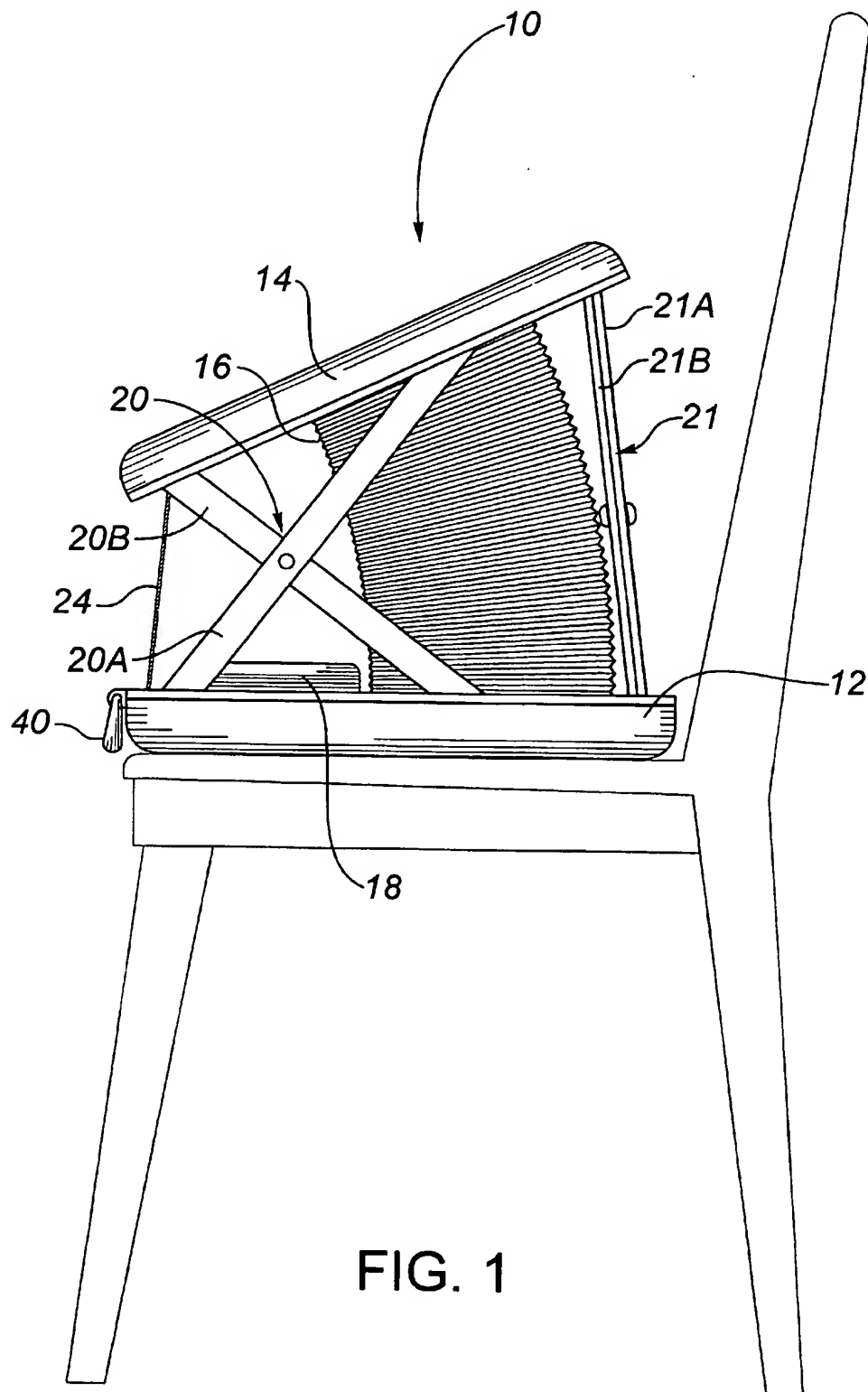


FIG. 1

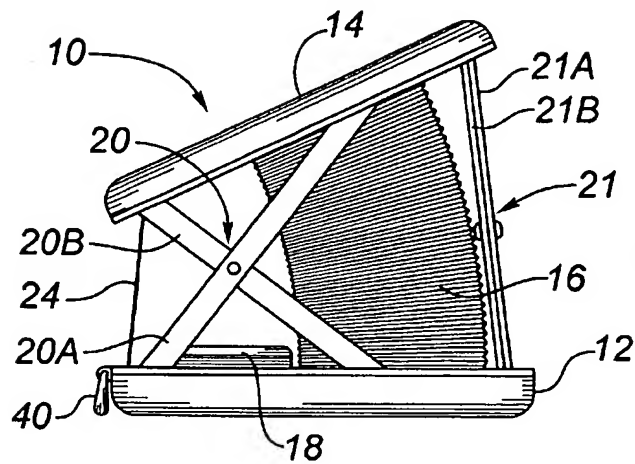


FIG. 2

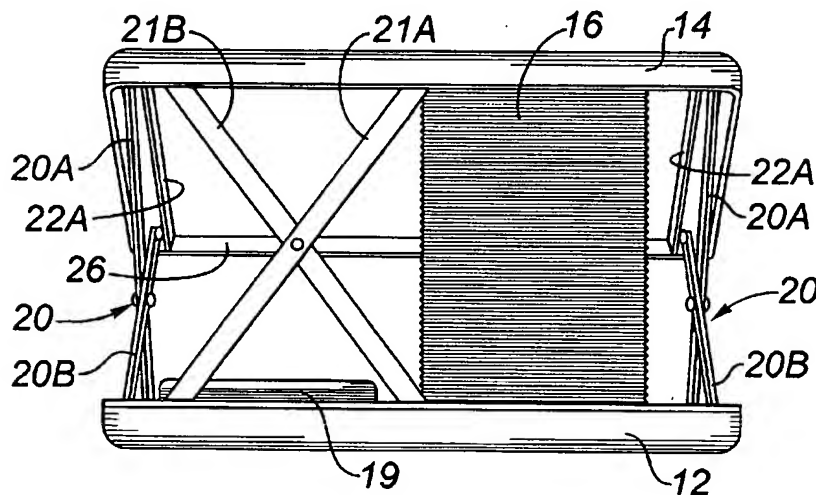


FIG. 3

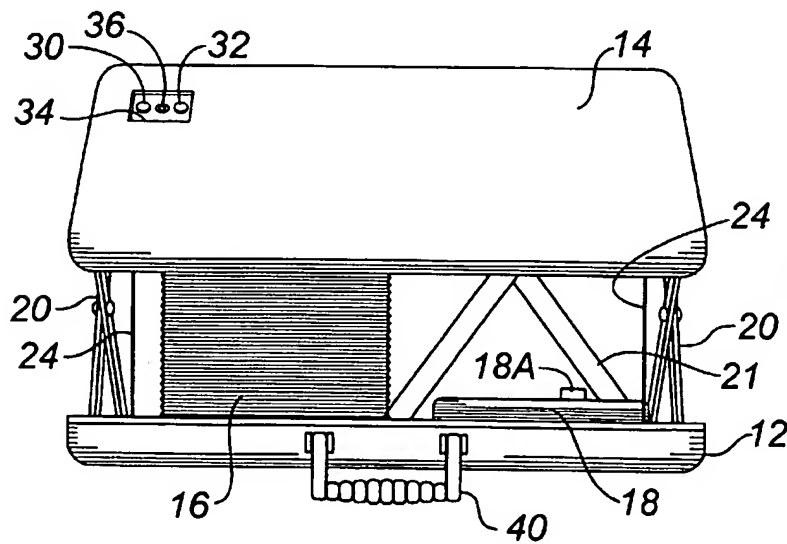
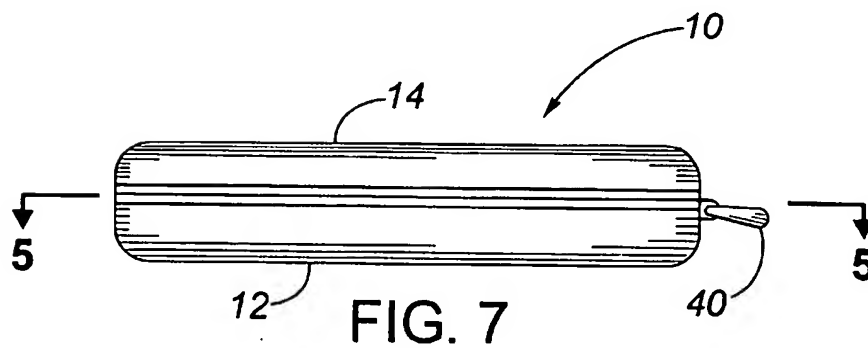
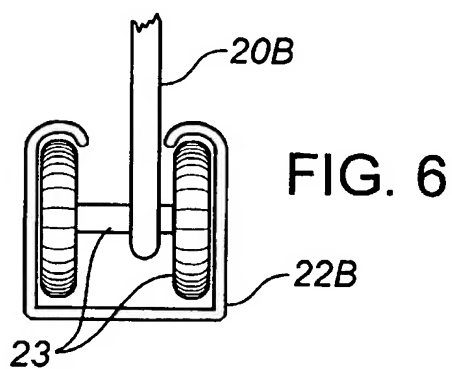
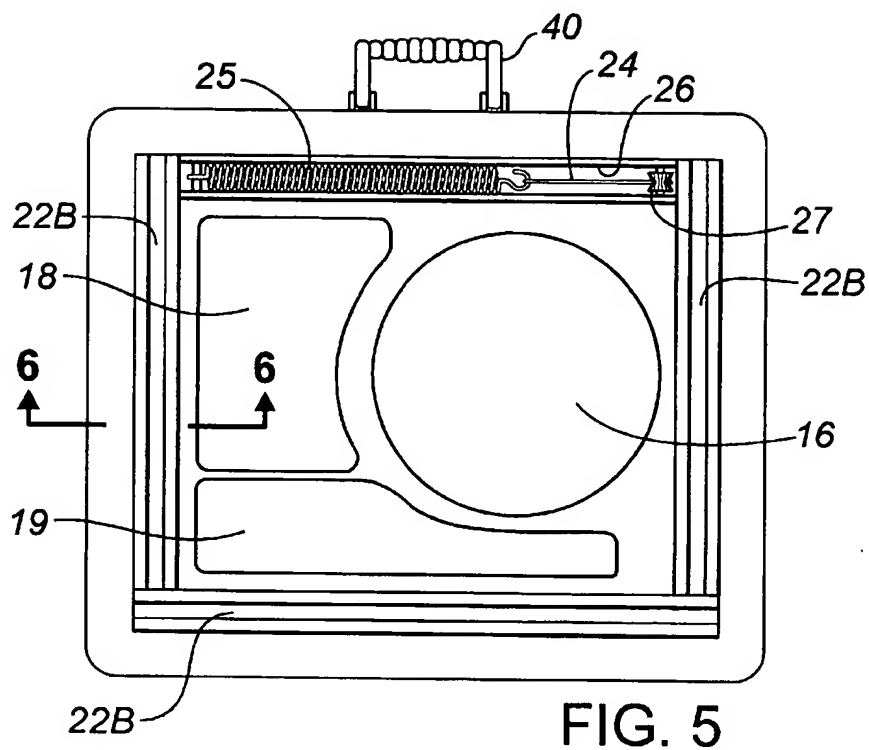


FIG. 4



PORTABLE SEATING ASSIST DEVICE

FIELD OF INVENTION

The present invention relates to a portable seating assist device for assisting persons with the acts of sitting down and rising from a seated position.

BACKGROUND OF INVENTION

Many people experience difficulty in rising from a seated position or seating themselves from a standing position. This difficulty may arise from a variety of causes such as arthritis, other chronic illnesses, injuries or obesity.

The prior art demonstrates many attempts to assist such people with seating assist devices. In particular, pneumatically inflated devices are described in U.S. Pat. Nos. 4,629, 162 (Porche, Dec. 16, 1982) and 5,361,433 (Vanzant, Nov. 8, 1994) and PCT Application PCT/GB96/01001 (Jeans). Each of these prior art devices includes an inflatable cushion and a detached blower unit, and each requires an external power source. Although these devices are portable, the separation of the cushion and the blower is an inconvenience. Further, these devices may only be used where an external power source is available, such as ordinary household electrical outlets.

Other prior art devices are more portable and do not require external power. The device described in European Patent Application No. 95200105.5 (Haan) uses a support member which is urged by torsion leaf springs to a raised position above a base member. The support member is hinged to the base member using an intermediate support member which allows the support member to remain relatively horizontal through its range of motion. Other hinged devices such as that described in U.S. Pat. No. 5,116,100 (Iversen, May 26, 1992) cause their users to be propelled forward rather than lifted upwards which is a significant disadvantage. The Haan device suffers from the drawback of all spring-activated devices in that the level of assist is governed by the strength of the spring. If too strong a spring is used, the device becomes difficult to use, as the speed of assist is uncontrollable. The device also becomes very difficult to close. If the spring is not strong enough, there is insufficient force to provide any real assistance to the user.

The prior art devices also suffer from a lack of stability or steadiness. Spring-activated devices will bob up and down as the user shifts his or her weight. The Vanzant device attempts to provide stabilization by inflating rear and side wall cavities first before inflating the centre cavity.

There is therefore a need in the art for a seating assist device which is conveniently portable, self-contained and which may be used on any seating surface. It may be further advantageous if such a device were to be stable and allow convenient operation which is controllable and adjustable by the user.

SUMMARY OF THE INVENTION

The present invention provides a seating assist device which is entirely selfcontained and conveniently portable.

In one aspect of the invention, broadly stated, the device comprises:

- (a) a base member;
 - (b) a seat member movable from a lowered position to a raised position above the base member;
 - (c) means to stabilize the seat member;
 - (d) means for lifting the seat member upwards; and
 - (e) power means for powering the lift means;
- wherein the stabilizing means, lift means and power means are each disposed between the base member and the seat member.

The base member and seat member preferably fit together to form an enclosed space between them, and the other elements of the invention are contained within the enclosed space. It is convenient but not essential to have the base and seat members shaped rectangularly, each having a front edge, a rear edge and two side edges.

The stabilizing means may comprise two scissor braces stabilizing the two side edges of the seat member, each scissor brace comprising first and second brace members pivotally interconnected along their lengths. The first brace member is pivotally fixed to the base member at one end and slidably engages the seat member at the other end and the second brace member is pivotally fixed to the seat member at one end and slidably engages the base member at the other end. Preferably, there are three scissor braces, one stabilizing each of two side edges and the rear edge of the seat member.

The lift means and the power means are preferably an air chamber inflatable by a battery powered air compressor. The air chamber may be fashioned of a non-stretch material that will not allow further expansion once the chamber is fully inflated and the weight of a user is brought to bear on the seat member.

In another aspect of the invention, the device comprises:

- (a) a base member;
- (b) a seat member movable from a lowered position to a raised position above the base member;
- (c) means for lifting the seat member upwards, said lift means disposed between the seat and base members;
- (d) power means for powering the lift means, said power means connected to the lift means; and
- (e) at least two scissor-braces disposed between the base member and the seat member such that one scissor-brace is at a substantially right angle to at least one other scissor-brace, the two scissor-braces supporting and stabilizing the seat member throughout its range of motion.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a side view of the device in its raised position on a chair.

FIG. 2 is a side view of the device in its raised position.

FIG. 3 is a rear view of the device in its raised position.

FIG. 4 is a front view of the device in its raised position.

FIG. 5 is a cross-sectional view along 5—5 in FIG. 7.

FIG. 6 is a cross-sectional detail of the track and roller mechanism of the support braces, along 6—6 in FIG. 5.

FIG. 7 is a side view of the device in its lowered position.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, the present invention, generally represented by reference number (10), is shown in its raised position, placed on a chair.

Referring to FIGS. 1, 2, and 3, the preferred embodiment of the invention comprises, in part, a base member (12), a seat member (14), an inflatable air chamber (16), an electric air compressor (18), a battery (19) for supplying electrical power to the compressor (18), two scissor-braces (20) along the sides of the invention, and a further scissor-brace (21) along the rear of the invention. The base member (12) and

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the seat member (14) are shaped so as to fit together and, when so fitted together, to enclose a space which houses the air chamber (16), compressor (18), battery (19), scissor-braces (20, 21), and related components. The air chamber (16) is preferably a polyurethane fabric tube which is fastened in air-tight fashion to the inner faces of the base member (12) and the seat member (14), and is connected to the compressor (18) in air-tight fashion by means of an air hose (not shown). Suitable air compressors which are compact enough to fit within the base and seat members (12, 14), are powerful enough to inflate the air chamber (16) against the weight of a user, and which may be battery powered, are readily commercially available.

The base member (12) and the seat member (14) may be fabricated from any suitable plastic or metal. In the preferred embodiment, these members (12, 14) are fabricated from injection molded polypropylene.

Each side scissor-brace (20) and the rear scissor-brace (21) comprises a first brace member (20a, 21a) and a second brace member (20b, 21b), which are pivotally interconnected along their lengths. One end of the first brace member (20a, 21a) is pivotally fixed to the base member (12), and the other end slidably engages the seat member (14). Similarly, one end of the second brace member (20b, 21b) is pivotally fixed to the seat member (14), and the other end slidably engages the base member (12).

In the preferred embodiment, the slidable engagement of the brace members is facilitated by elongate upper tracks (22a) fixed to the seat member (14) as shown in FIG. 3, and by elongate lower tracks (22b) fixed to the base member (12) as shown in FIG. 5. As illustrated in FIG. 6, the slidably engaged end of each brace member is rotatably mounted to a roller assembly (23) retained within the tracks (22a and 22b).

The preferred embodiment further comprises a lift control switch (30) and a lowering valve (32), which may be mounted in a recess (34) in the seat member (14) as shown in FIG. 4. Also shown in FIG. 4 is the recharging outlet (36) where a converted AC-DC adaptor (not shown) may be connected in order to recharge the battery (19). When the invention is in the closed position, as illustrated in FIG. 7, operation of the lift control switch (30) will activate the compressor (18), which in turn will pump air through the air hose into the air chamber (16), inflating the air chamber (16) and raising the seat member (14). This raising operation may be carried out with or without a person sitting on the seat member (14). It is readily seen that the seat member (14) may be deployed in a variety of positions depending on the extent to which the air chamber (16) is inflated.

The upward movement of the seat member (14) causes the sliding ends of the scissor-brace members to slide inwardly in their corresponding tracks (22a and 22b), such that each scissor-brace assembly (20, 21) assumes the approximate shape of the letter X. The selected geometric configuration of the side scissor-braces (20) will determine the angular orientation of the seat member (14) as it progresses from the fully closed position to the fully open position. If the intersection of the scissor-brace members (21a, 21b) is centered, then the seat member (14) will be raised straight up, as is the case with the rear scissor-brace (21) in the preferred embodiment. In the preferred embodiment, the seat member (14) tilts slightly forward as it rises. The tilt is introduced by the off-center intersection of the brace members of the two side scissor-braces (20) as shown in FIG. 2. The figures show the preferred embodiment where the front and rear edges of the seat member (14) remain horizontal throughout its range of travel.

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In the preferred embodiment, the invention further comprises an automatic lift limit switch (18a), which will de-activate the compressor (18) when the seat member (14) has been raised to a pre-determined position. The lift limit switch thereby prevents the various components of the invention from being overstressed by excessive pressure build-up in the air chamber (16).

When the invention is in the open position, as illustrated in FIGS. 1, 2, 3, and 4, it may be lowered by actuating the lowering valve (32), which causes air to be released from the air chamber (16). The seat member (14) may then be lowered as air leaves the air chamber (16), whether or not a person is sitting on the seat member (14). The downward movement of the seat member (14) causes the sliding ends of the scissor-brace members (20a, 20b, 21a and 21b) to slide outwardly in their corresponding tracks (22a and 22b) such that the scissor-brace assemblies (20, 21) become progressively flatter until the invention reaches the fully closed position.

The invention may further comprise a mechanism to increase the speed at which the seat member (14) is lowered after actuation of the lowering valve (32) by increasing the rate of deflation of the air chamber (16). In the preferred embodiment, this mechanism comprises two cables (24), as illustrated in FIGS. 1, 2, 4, and 5, to increase the rate at which the seat member (14) will be lowered upon actuation of the lowering valve (32). One cable (24) is attached at one end to the seat member (14) and then passes around and under a pulley (27) which is rotatably mounted within an elongate channel (26) fixed to the base member (12), and is then fastened to one end of a coil spring (25), which is positioned within the channel (26) and anchored at one end thereto. The other cable (24) is similarly attached at one end to the base member (12) and then passes around and under a further pulley (27) which is rotatably mounted within a further elongate channel (26) fixed to the seat member (14), and then fastened to one end of a further coil spring (25), which is positioned within the channel (26) and anchored at one end thereto.

When the invention is raised from the closed position to an open position, the cables (24) will exert tension on the springs (25). When the lowering valve (32) is activated, the tension in the springs (25) acts to pull the seat member (14) down, thus assisting the lowering process. The assist provided by the cables (24) and springs (25) is of particular benefit when it is desired to close the invention without anyone sitting on it. The springs (25) should not be so strong as to impair the ability of the compressor (18) to inflate the air chamber (16) in normal use.

In the preferred embodiment, the lowering valve (32) incorporates an automatic re-set feature (not shown), whereby the lowering valve (32) will close automatically when the invention reaches the fully closed position, such that the device (10) will be ready for immediate re-use if desired.

In the preferred embodiment, the battery (19) is rechargeable, and the invention further comprises a battery conditioner (not shown) mounted in the space enclosed by the base member (12) and the seat member (14) which acts to prevent overcharging of the battery (19). Suitable batteries and conditioners are very well known in the art. In the preferred embodiment, a 12 V DC, nickel-cadmium battery is used.

In the preferred embodiment of the invention, the bottom of the base member (12) will have ridges (not shown) formed therein, so as to minimize the potential for slippage

of the base member (12) relative to the surface upon which it is positioned. The invention will further comprise a carrying handle (40), ideally connected to the front edge of the base member (12) as shown in FIGS. 1, 2, 4, 5, and 7. When in the closed position, the invention resembles a compact attache case and is as portable as such.

A user may carry the invention and place it on a seating surface such as a chair. The user may then activate the air compressor (18) by pressing the lift control switch (30). The compressor (18) fills the air chamber (16) and causes the seat member (14) to rise to its open, raised position, as shown in FIGS. 2, 3 and 4. The user may then sit on the raised seat member (14). In the preferred embodiment, the air chamber (16) is fabricated from polyurethane fabric which does not stretch. As a result, the device (10) does not compress when the user sits on it. As well, the seat member (14) does not rock in any direction because of the three scissor-braces (20, 21) stabilizing it.

Once the user is supported by the seat member (14), he or she may lower the seat member (14) by activating the lowering valve (32). The seat member (14) then is lowered to its closed position. The user is now in a comfortable seated position on the closed device (10). The process of raising the seat member (14) is repeated to assist the user to a standing position.

Alternatively, the device (10) in its closed state may be positioned underneath a prone or seated person in need of assistance and activated to assist that person to a standing position.

The foregoing description of the preferred embodiment of the invention is illustrative only of the invention. Numerous modifications and changes will be apparent to those skilled in the art which fall within the scope of the claimed invention. For example, it is not essential to this invention that the lift means comprise an inflatable air chamber and an air compressor. It is contemplated that the lift means may comprise an electric motor which physically lifts the seat member (14) by a variety of possible lift mechanisms. As a further example, the mechanism to increase the deflation of the air chamber (16) may take a variety of different forms which are within the scope of the claims below.

The configuration and structure of the lift means, the power means, the various valves and switches may take any variety of forms. What is essential and claimed as novel is that all such elements be self-contained within the device (10) or associated with the device (10) so as not to unduly impair portability or convenience.

The scissor-braces (20, 21) may be deployed in a number of alternative configurations. Stability of the seat member (14) results from the rear scissor-brace (21) which prevents side-to-side rocking of the seat member (14) in combination with the two side scissor-braces (20) which prevent fore-aft rocking of the seat member (14). As a result, the seat member (14) is rigidly supported when in any raised position.

The embodiments of the invention in which an exclusive property and privilege are claimed are as follows:

1. A portable self-contained seating assist device comprising:

- (a) a base member having a front edge, a rear edge and two side edges;
- (b) a seat member having a front edge, a rear edge and two side edges, said seat member movable from a lowered position to a raised position above the base member;
- (c) means for stabilizing the two side edges of the seat member;
- (d) means for stabilizing the rear edge of the seat member;
- (e) means for lifting the seat member upwards comprising an inflatable non-stretch air chamber and an air compressor connected to the air chamber;
- (f) means for powering the lift means; and
- (g) means for increasing the rate of deflation of the air chamber to lower the seat member comprising:
 - i. a pair of elongate front channel member, one such channel being affixed to the lower surface of the seat member adjacent to the front edge thereof, and the other channel being similar affixed to the upper surface of the base member;
 - ii. a pair of pulleys, one of which is rotatably mounted within each of the front channels and near one end thereof;
 - iii. a pair of springs, one of which is positioned within each of the front channels, and one end of which is anchored to its corresponding channel near the end opposite the pulley mounted in that channel;
 - iv. a cable attached at one end to the unanchored end of the spring in the front channel of the seat member, passing over and around the pulley in the front channel of the seat member, and attached at its other end to the base member near the front thereof;
 - v. a cable attached at one end to the unanchored end of the spring in the front channel of the base member, passing under and around the pulley in the front channel of the base member, and attached at its other end to the seat member near the front thereof;

wherein the stabilizing means, lift means and power means are each disposed between the base member and the seat member.

2. The device of claim 1 wherein the power means is a battery.

3. The device of claim 2 wherein the battery is rechargeable.

4. The device of claim 1 further comprising a lift control switch for activating the compressor.

5. The device of claim 1 further comprising an automatic lift limit switch for automatically de-activating the compressor upon the seat member being deployed to a predetermined position.

* * * * *



US006264279B1

(12) **United States Patent**
Chow

(10) Patent No.: **US 6,264,279 B1**
(45) Date of Patent: **Jul. 24, 2001**

(54) **THERAPEUTIC SLING SEAT**

(56)

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(76) Inventor: **William W. Chow**, 334 La Amatista Rd., Del Mar, CA (US) 92014

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **09/488,892**

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(22) Filed: **Jan. 21, 2000**

Primary Examiner—Anthony D. Barfield

(74) *Attorney, Agent, or Firm*—Jerrold J. Litzinger

Related U.S. Application Data

(57)

ABSTRACT

(62) Division of application No. 08/965,268, filed on Nov. 6, 1997

(60) Provisional application No. 60/030,241, filed on Nov. 8, 1996.

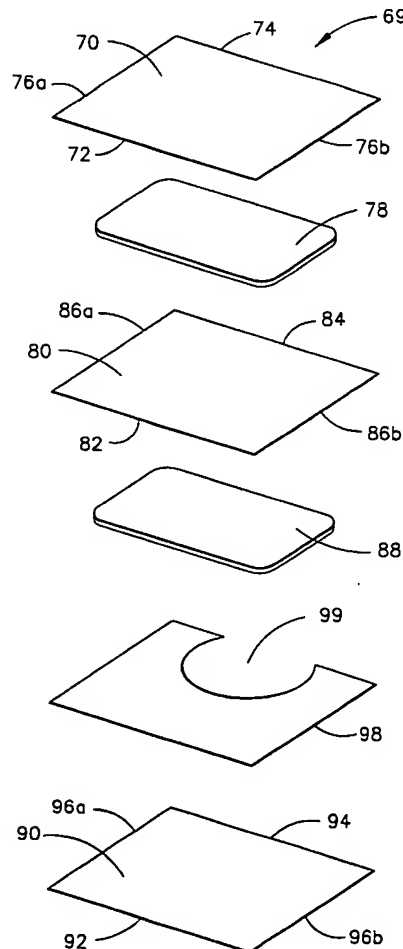
(51) Int. Cl.⁷ **A47C 7/20**

(52) U.S. Cl. **297/452.56; 297/452.22; 297/457.27**

(58) Field of Search 297/440.11, 457.55, 297/452.56, 457.5, 452.21, 452.22, 452.23, 452.24, 452.26, 452.27; 5/653, 654

A therapeutic sling seat comprising a flexible material which is non-uniform in stiffness providing maximum contact surface area with the body of a person seated in the seat by spreading the forces away from high pressure areas using multiaxis tension forces. The seat material in tension adapts to the contour of the posterior of the seated person. By controlling the pressures on the ischial tuberosities, physical problems such as ulcers can be avoided.

8 Claims, 9 Drawing Sheets



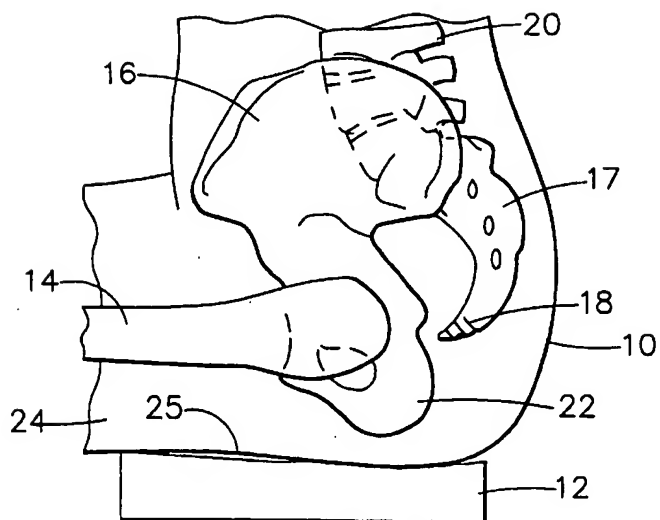


FIG. 1

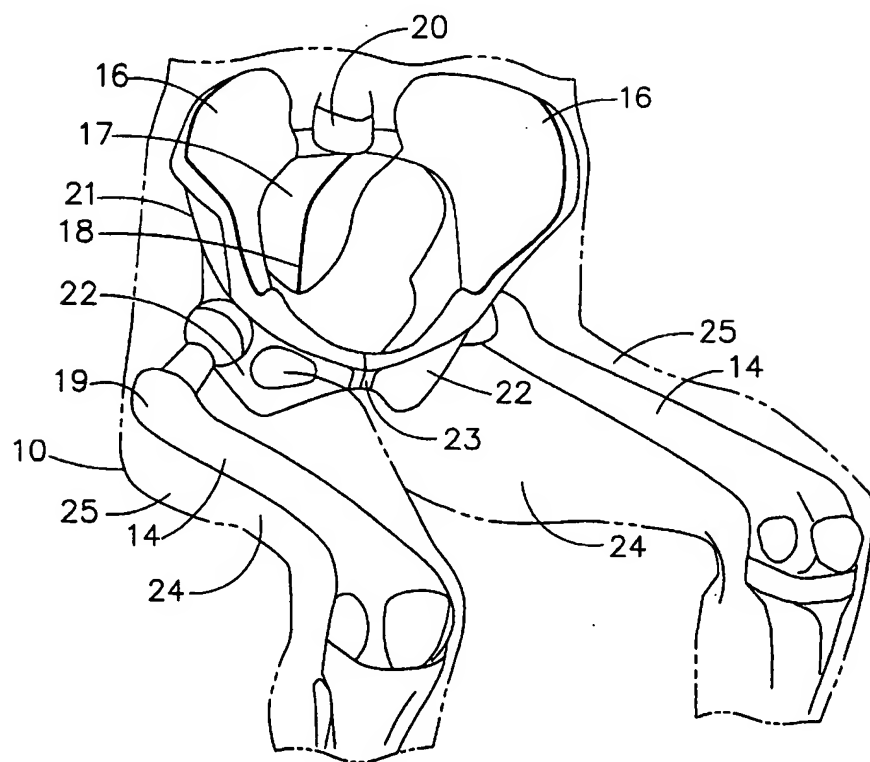


FIG. 2

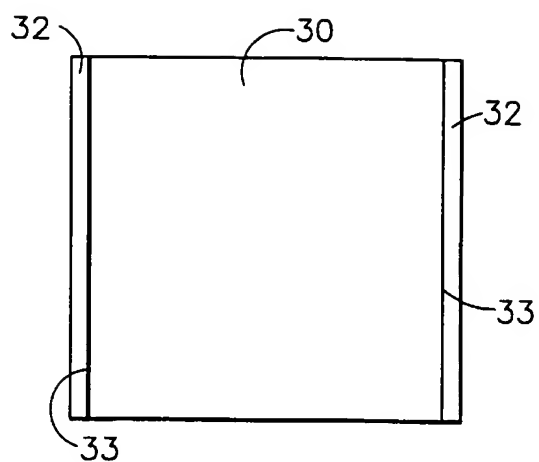


FIG. 3

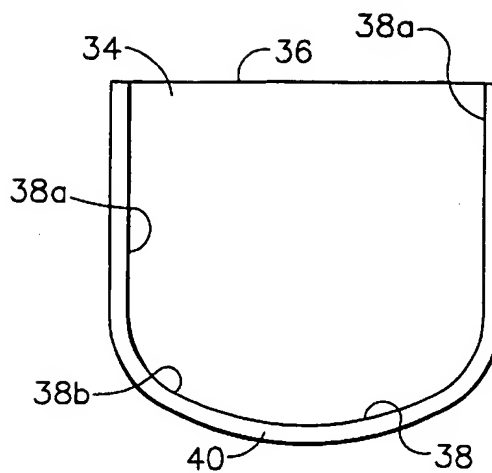


FIG. 4

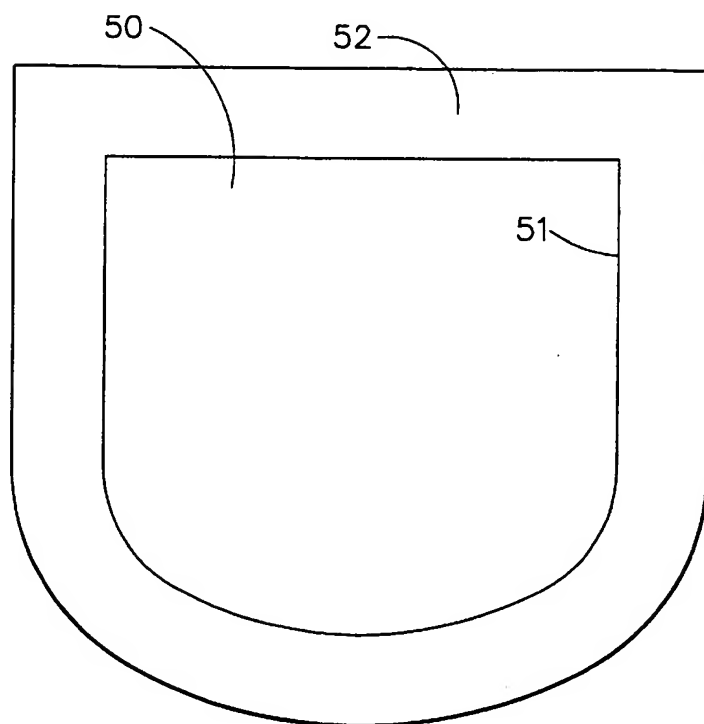


FIG. 5

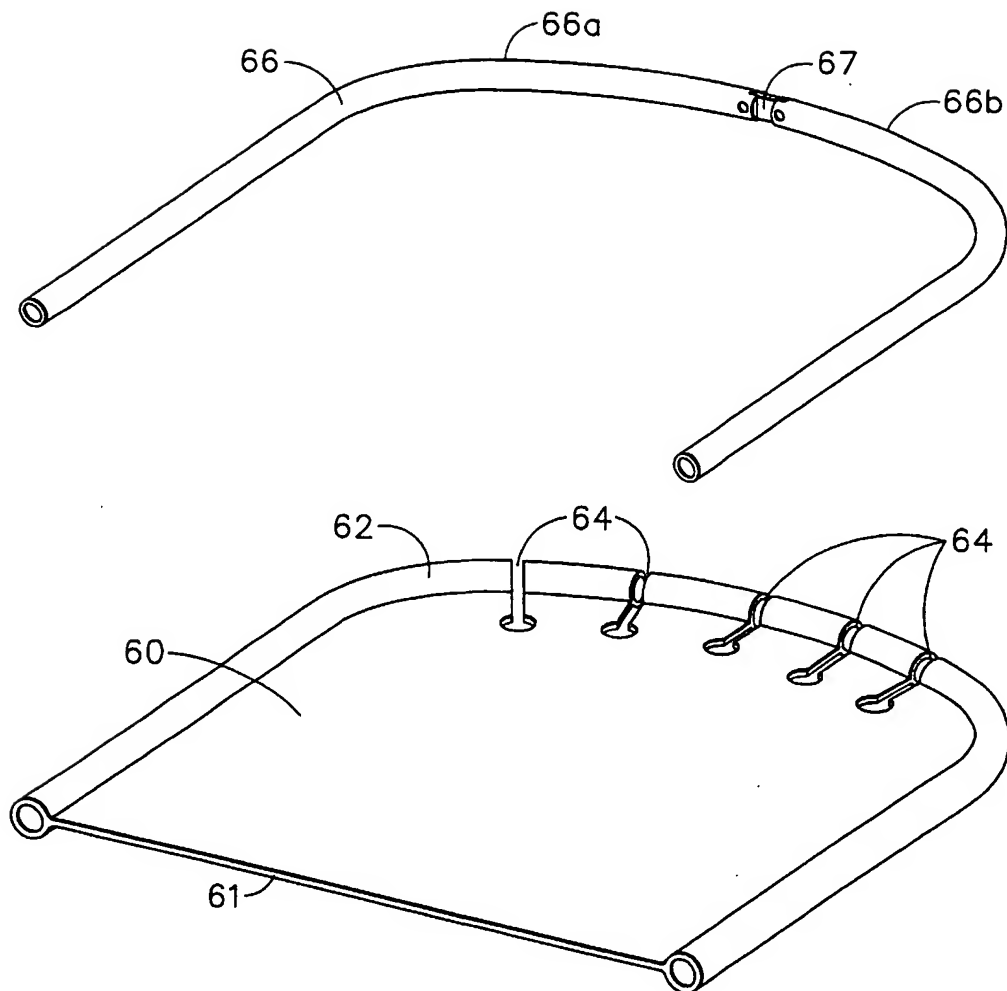


FIG. 6

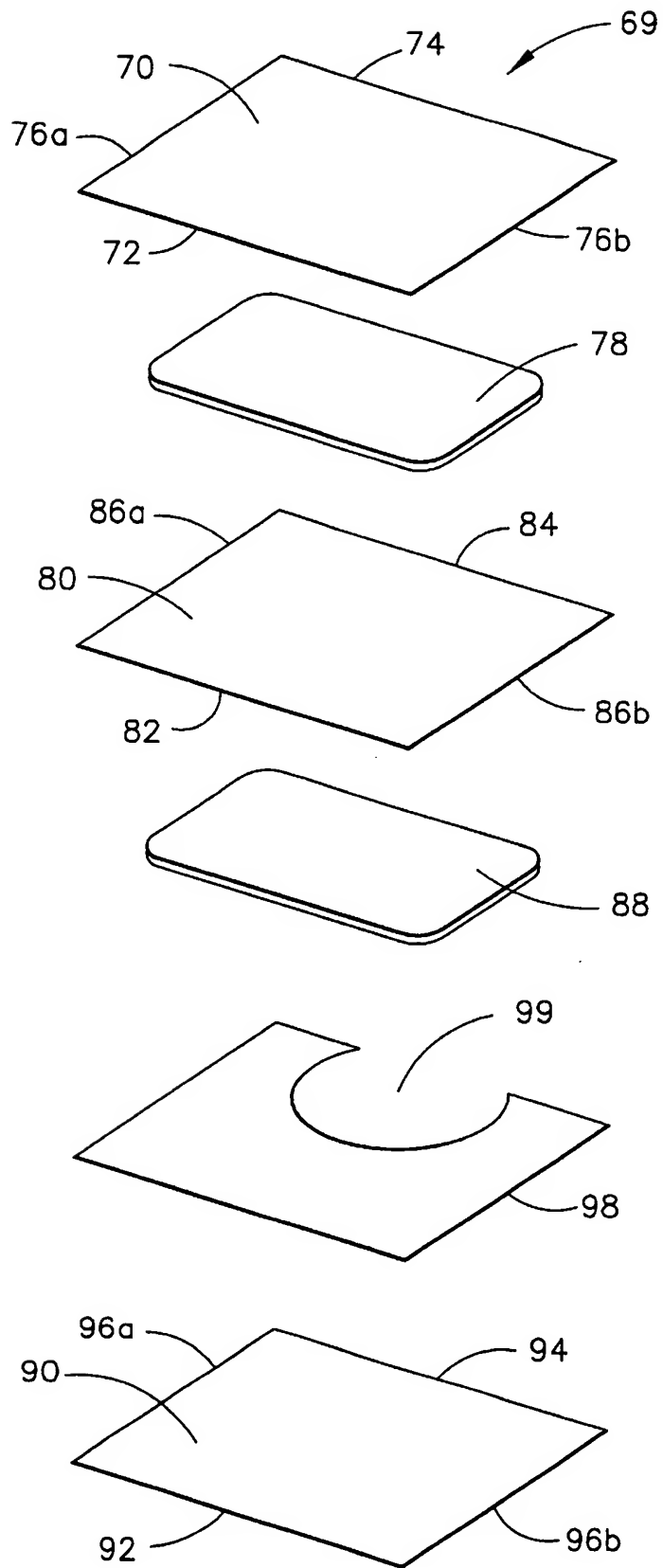


FIG. 7

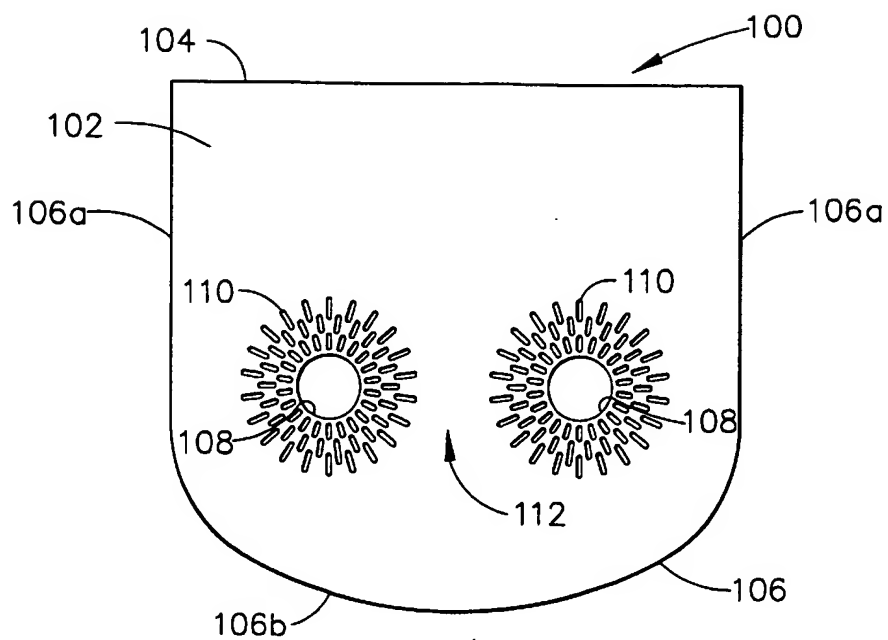


FIG. 8

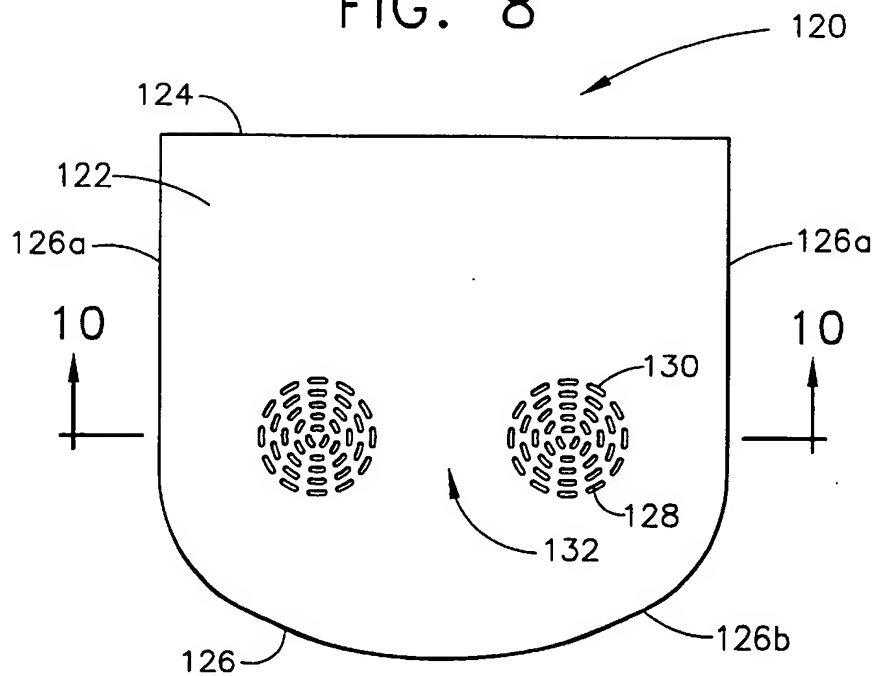


FIG. 9

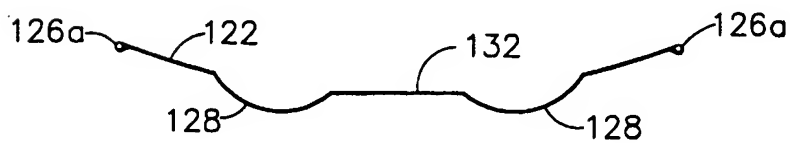


FIG. 10

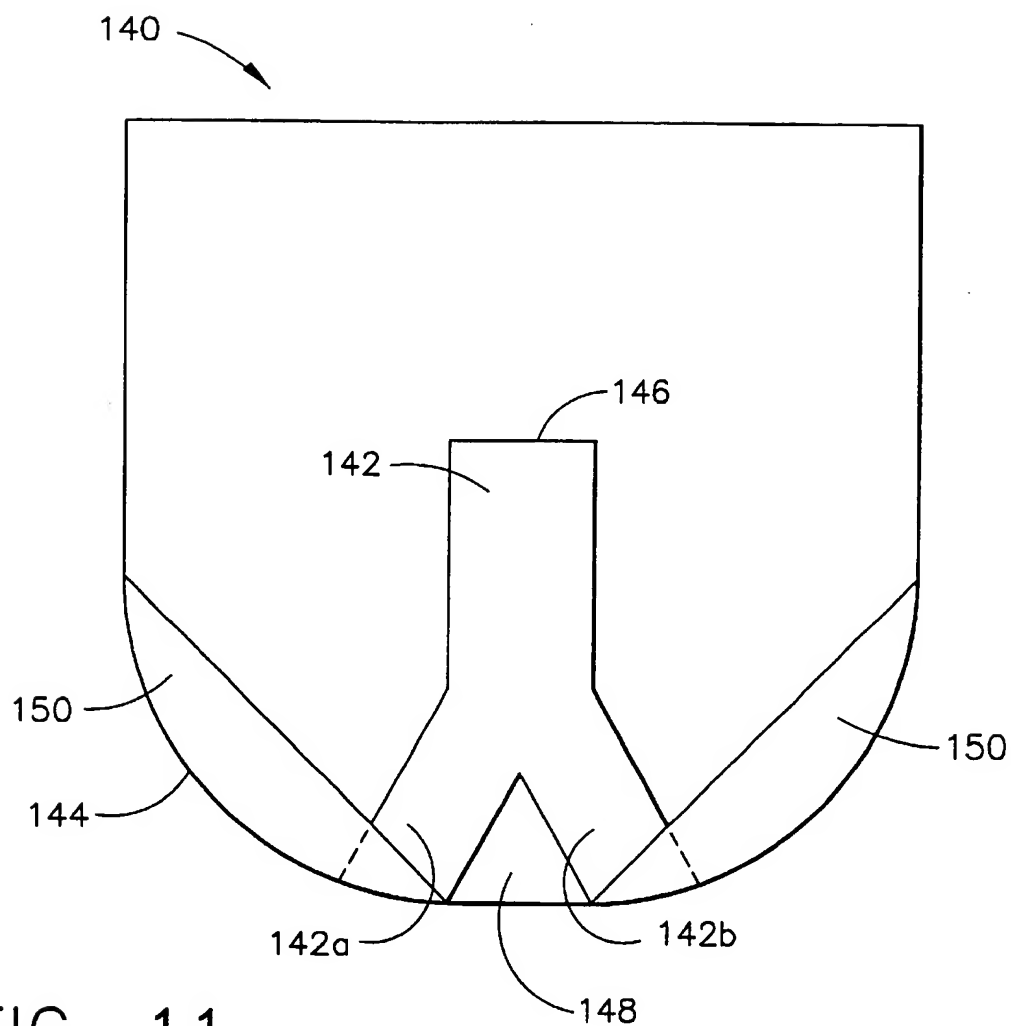


FIG. 11

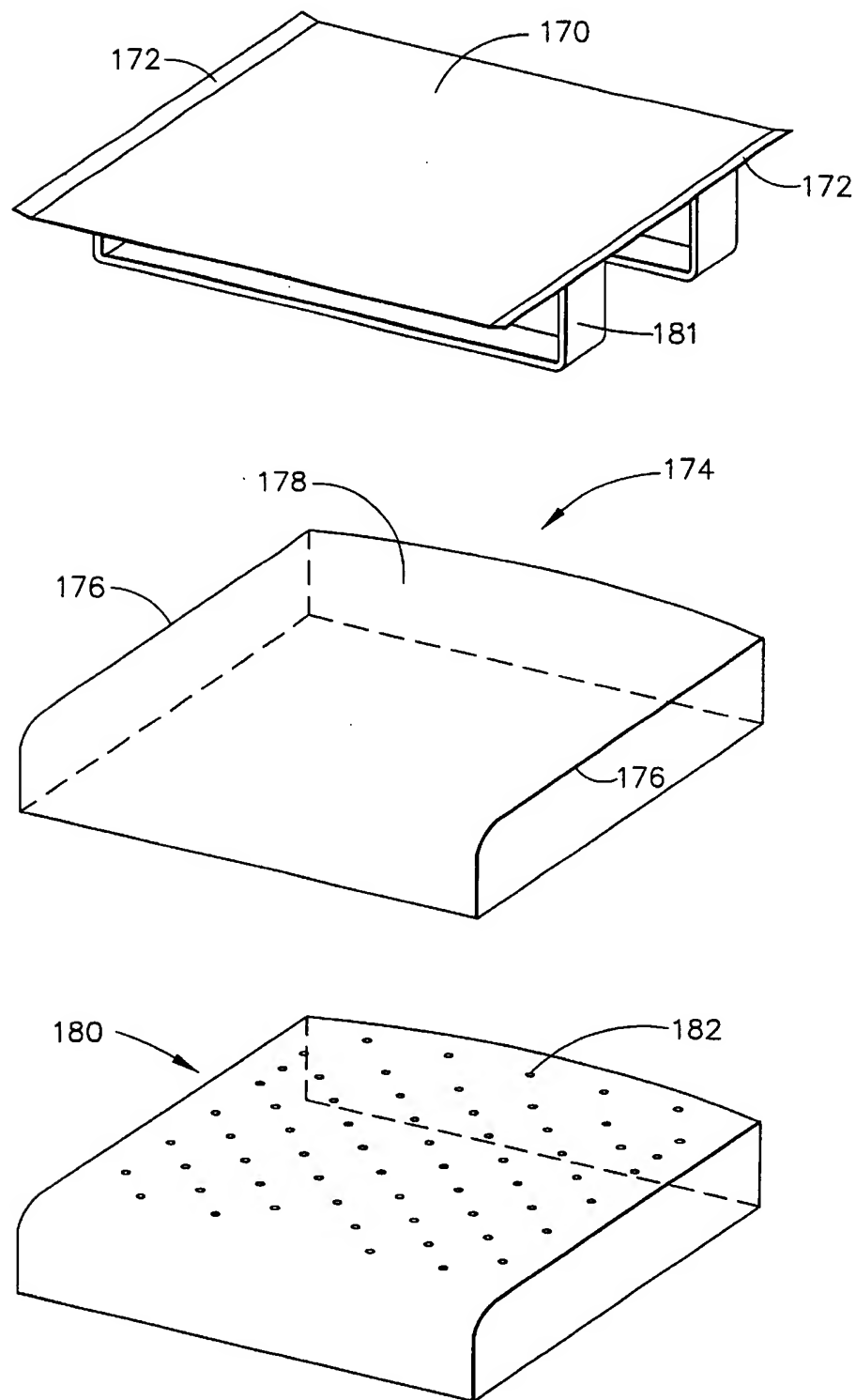


FIG. 12

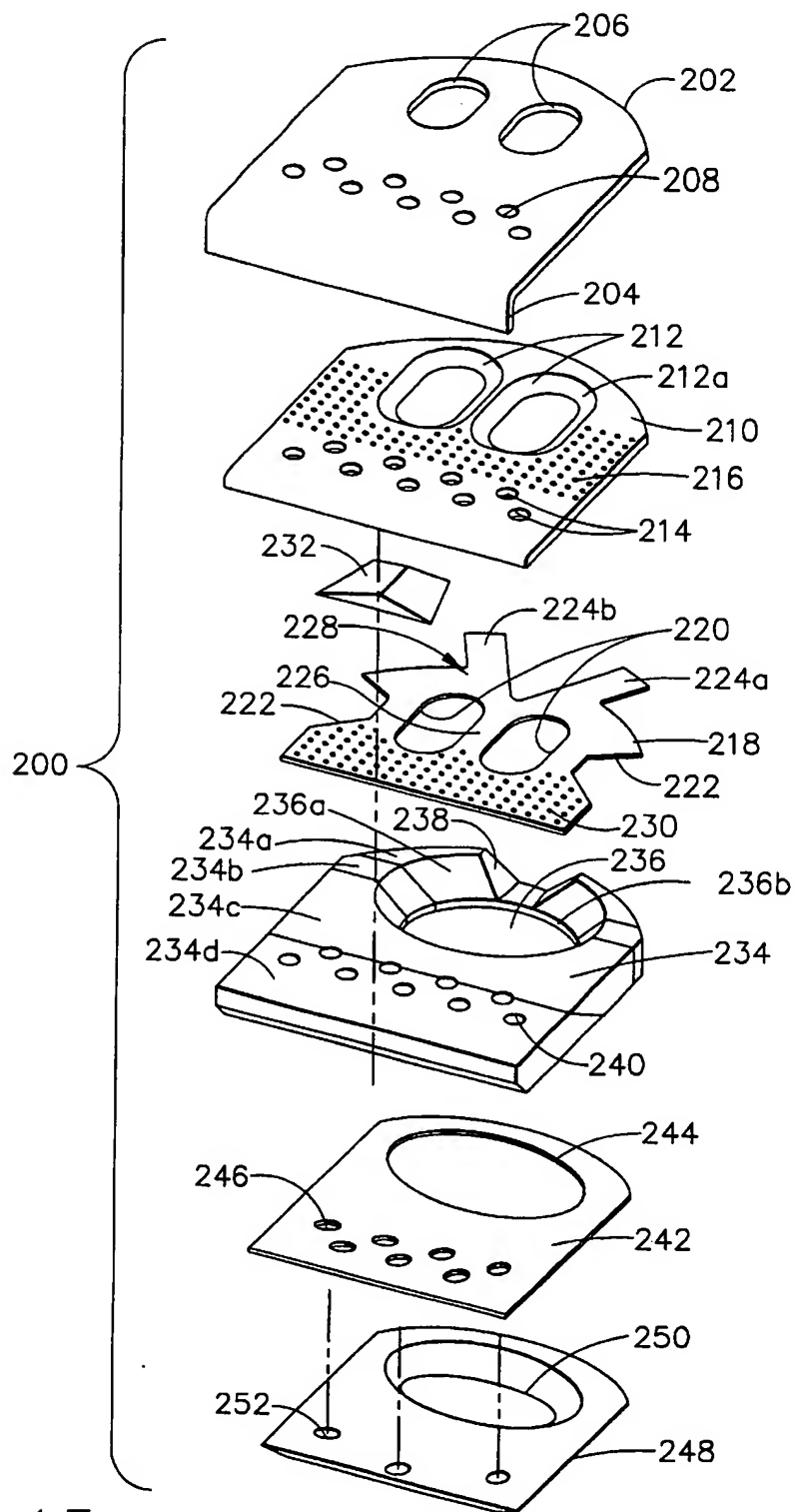


FIG. 13

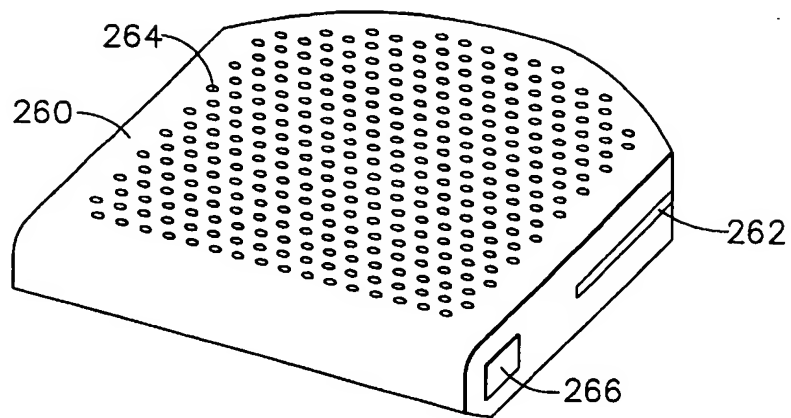


FIG. 14a

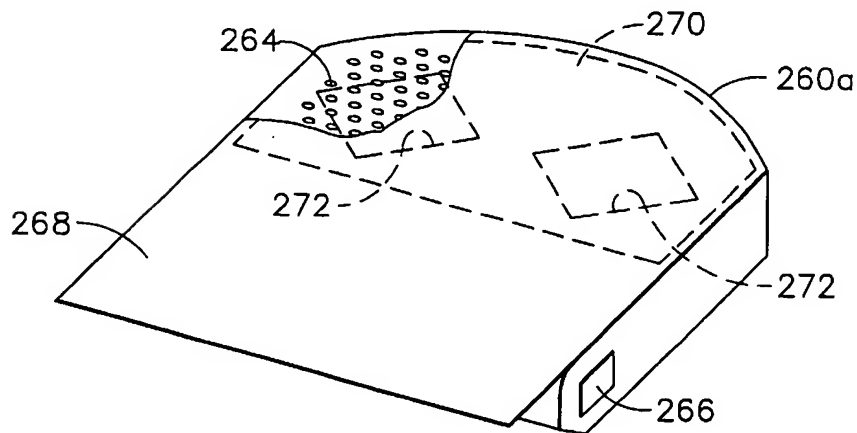


FIG. 14b

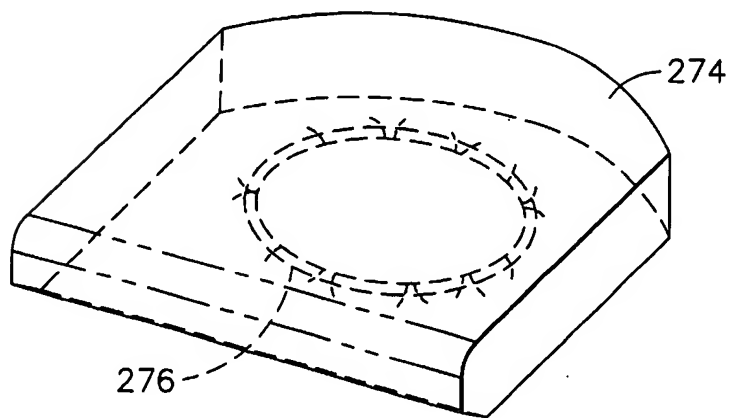


FIG. 15

THERAPEUTIC SLING SEAT

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application is a divisional of co-pending application Ser. No. 08/965,268, filed Nov. 6, 1997 which application claims priority from provisional patent application Ser. No. 60/030,241, filed Nov. 8, 1996, which application is incorporated herein in its entirety by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to structures for supporting the human body while seated, and, in particular, to an improved cushioned sling seat structure which is designed to optimize the comfort and stability of the user.

2. Description of the Prior Art

There has been much research conducted over the years to attempt to improve the comfort of structures which serve to support the human body in a sitting position. It is well known that individuals who are required to sit for long periods are subject to discomfort, fatigue, pain, and various other afflictions associated with the lack of proper support of the torso of a person seated in an erect position over a sustained period of time. A common example of this problem occurs with individuals confined to wheelchairs. The lack of movement in this sitting position restricts blood flow, causing mechanical damage to body tissues and often leads to painful sores and ulcers.

Many attempts have been made to alleviate, if not prevent, these problems. These developments generally fall into several categories.

The most common types of cushions which have been used to address these problems are foam cushions. Foam cushions are popular, as they are lightweight, fairly durable, and inexpensive to manufacture. Foam pads with cut-out areas, convoluted surfaces, wedge-shaped slots and cored-out sections have been developed to minimize the adverse effects on the human body. Examples of these devices are taught in U.S. Pat. Nos. 4,042,987; 4,713,854; 3,111,689; 2,047,616; 3,337,884; and 3,222,694. There are several disadvantages, however, to the use of foams in cushions; foam generally has poor shear and tension properties, and also suffers from the inability to distribute loads or restoring forces evenly.

Another type of cushion which has been tried is a gel cushion. This type of cushion uses a viscous substance contained within some type of flexible structure capable of conforming with the body contours in contact with the cushion. While these cushions possess favorable tension and shear/friction properties, they are often heavy and bulky, and tend to deteriorate with heavy use. Examples of these cushions are taught in U.S. Pat. Nos. 3,858,379; 3,308,491; 3,663, 973; 3,689,948; 4,728, 551; 4,726,624; 5,336,708; 5,334,646; and 4,588,229.

Still another type of cushion which has been tried is a fluid-filled cushion. This type of cushion uses a fluid, such as gas or liquid, contained within a flexible envelope to allow the envelope to conform to the body contour. While gas-filled cushions are very light and inexpensive, the buoyancy is zero and the support of the body depends on a suitable hammock effect of the envelope plus the pressure of the air inside. Stability is generally greater with air filled cushions than that of liquid filled cushions because of increased tension in the envelope. Examples of the fluid

filled cushions are shown in U.S. Pat. Nos. 2,823,394; 3,251,075; and 3,984,886.

Another type of cushion design which is available in the marketplace is the thixotropic, or "putty-filled" cushion. These cushions generally conform to the body in a suitable fashion as the material flows, can stiffen under fast loading to provide a solid and comfortable base for the body, and are designed to accurately control the flow of the material inside the cushion. However, this type of cushion tends to be fairly heavy, making it somewhat awkward to handle, can bottom out in some instances and tend to be relatively expensive compared to other cushions available. Examples of these cushions are taught in U.S. Pat. Nos. 4,726,624; 4,588,229; 4,728,551; and 5,018,790.

Finally, some cushion designs attempt to combine different features from the cushion types previously discussed to attempt to improve upon its performance. U.S. Pat. No. 2,819,712 combines a foam cushion with an air filled bladder; U.S. Pat. No. 5,524,971 uses a combination of fluid layers combined with foam layers; and U.S. Pat. No. 5,513, 899 uses an envelope filled with a combination of petrolatum and hollow glass spheres.

While there have been many attempts to provide a superior cushion to satisfy a diverse range of users, each design has particular deficiencies which make it difficult to gain universal acceptance. The one feature which is present in all of the aforementioned cushions is the fact that they all are subject to compression forces.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a cushion which will provide maximum contact surface area along with uniform pressure on the body by spreading the forces away from high pressure areas using multiaxis tension forces.

It is also an object of the present invention to provide a seat which is inexpensive, lightweight, and durable, and offers stability.

It is a further object of the present invention to provide a cushion which can provide comfort and ventilation for a person seated for long periods of time without causing injury or fatigue.

These and other objects are accomplished in the present instance by a sling seat consisting of a thin and flexible material having non-uniform properties which allows the material in tension to adapt to the contour of the rear of the person seated. A person cannot sink into a compression type cushion more than the thickness of the cushion. In this tension type design, the ischial tuberosities of a person seated in the cushion are suspended, and will not "bottom out" in the cushion. By controlling the pressures on the ischial tuberosities and the coccyx of persons seated on a cushion manufactured according to the present invention, physical problems such as ulcers can be avoided in persons who must sit for long periods of time. Different embodiments of the invention are taught having features which enhance the desirable properties of the sling seat.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view showing a partial skeleton of a person in a sitting position;

FIG. 2 is an isometric perspective view showing a partial skeleton of a person in a sitting position;

FIG. 3 is a top view of a traditional wheel chair sling seat;

FIG. 4 is a top view of an alternative embodiment of a traditional sling seat having improved support of the back edge;

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FIG. 5 is a top view of an alternative embodiment of the seat shown in FIG. 4;

FIG. 6 is a perspective view of another alternative embodiment of a seat according to the present invention;

FIG. 7 is a perspective view of a multi-layer design with stiffener, described by the technology of the present invention;

FIG. 8 is a top view of a molded sheet rubber design according to the present invention;

FIG. 9 is a top view of an alternative embodiment of the seat shown in FIG. 8;

FIG. 10 is a cross-sectional view taken along lines 10—10 of FIG. 9;

FIG. 11 is a top view of another embodiment of a seat according to the present invention having additional pubic arch and ilium support;

FIG. 12 is a perspective view of another embodiment of a seat according to the present invention;

FIG. 13 is an exploded view of the components of an invisible frame design according to the present invention;

FIGS. 14a and b each show a perspective view of a cushion covering for use with the cushion taught in FIG. 13; and

FIG. 15 is a perspective view of a cosmetic cover for use with the cushion taught in FIG. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1 and 2, there is depicted a section of the torso of a person in a sitting position, with the skeletal structure shown in detail. In this position, the gluteus maximus 10 is supported by a horizontal frame member 12 such that the femur or thigh bones 14 are supported in a substantially horizontal position. Also shown in FIGS. 1 and 2 are the pelvic or hip bones 16, the sacrum 17, the coccyx 18, the trochanter 19, the lumbar vertebrae 20 of the spine, the ilium 21, the ischial tuberosities 22, the pubic arch 23, the bicep muscles 24 and the proximal thigh regions 25.

It is well known that one of the major causes of discomfort experienced by a sitting person is pressure. The weight of the upper body is concentrated at bony prominences or projections of the body, such as the ischial tuberosities 22 and coccyx 18. Pressure exerted over a long period of time can often cause mechanical damage to the body tissue, causing ulcers and discomfort in the area of the gluteus maximus 10 and the bicep muscles 24 under the weight concentrated at the ischial tuberosities 22 and, to some extent, the femur 14, depending on how the body is situated in a particular chair. Usually, a sitting person unconsciously adjusts his body position when discomfort is felt. However, for those handicapped persons who cannot feel pain or who are unable to adjust their body positions, tissue damage can very easily result.

FIG. 3 shows a basic sling seat construction. A flexible membrane 30, which may be fabric or any similar material, is suspended between a pair of supports 32 which are attached along opposing edges 33 of membrane 30. When a person sits upon that type of sling seat, membrane 30 deflects to form a concave surface between a catenary and the form of the body of the person sitting in the seat. The strength of membrane 30 is a function of the mechanical properties of its material and the method of its manufacture. In a traditional sling seat, the material for membrane 30 is usually chosen such that mechanical properties such as elasticity and friction are uniform in any location and

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direction on the material. In the sling seat of the present invention, however, the material of membrane 30 is selected such that a large surface contact area is obtainable by use of a thin and stretchable material which is non-uniform in stiffness. Several suitable materials for use in the present invention are LYCRA and POLARTEC. These fabrics provide a strong, yet very flexible, membrane by which the body weight of a person is entirely supported by multi-axis tension forces in the material, and allow the seat to essentially conform to the shape of the body and provide maximum surface contact area. Thus, the area of the seat located under the ischial tuberosities 22, where the pressure on the tissue is quite high in a traditional sling seat, conforms to the shape of the gluteus maximus 10, thereby minimizing the pressure.

FIG. 4 shows an alternative embodiment of the basic sling seat construction of the present invention. The sling seat consists of a flexible membrane 34 having a forward edge 36 and a peripheral edge 38. Edge 38 consists of a pair of substantially parallel sides 38a connected by a curved side 38b. Edges 38a on each side are connected by a rear edge 40. Membrane 34, which is constructed of a stretchable material non-uniform in stiffness such as LYCRA, is suspended along its peripheral edge 38. In this embodiment, membrane 34 more completely conforms to the shape of the body of the person sitting in the seat than membrane 30 of the previous embodiment, as membrane 34 is supported on all sides except front edge 36.

FIG. 5 shows an alternative embodiment of a sling seat manufactured using the principles of the seat shown in FIG. 4. Membrane 50, having an outer edge 51, is constructed from the same material and in the same basic shape as membrane 34. However, a peripheral membrane 52 is attached along the outer edge 51 of membrane 50. Membranes 50 and 52 can be constructed from the same type of flexible material having non-uniform characteristics, or it may be desirable for membrane 50 to exhibit a different rigidity characteristic than the peripheral membrane 52, so that the weight bearing zone of the seat, specifically the area under the ischial tuberosities, will conform more closely to the body and more evenly distribute the pressure. In this embodiment, the inner membrane 50 can be selected to more closely fit the desired characteristics of elasticity for different persons, while maintaining a different peripheral membrane 52 with physical characteristics most ideally suited for attachment to a support frame.

FIG. 6 shows a variable thickness molded rubber sling seat which is constructed according to the principles of the present invention. In this embodiment, cushion 60 consists of a one piece molded rubber form having a front edge 61 and a U-shaped channel 62 positioned about its remaining periphery. A series of notches 64 are present along the rear of the periphery to enhance the flexibility of cushion 60. A cylindrical frame 66 formed from a pair of tubular sections 66a and 66b coupled together at a hinge 67 is sized to fit within channel 62 of cushion 60. Hinge 67 allows frame 66 to be folded to a compact form. When cushion 60 is suspended from frame 66 in a suitable structure such as a wheelchair, cushion 60 deflects to conform to the shape of the body seated on it, as the rubber flexes in tension, accommodating the curvature of the body and minimizing the pressure by distributing the resultant forces evenly.

Referring now to FIG. 7, another alternative embodiment of a sling seat 69 similar to that of FIG. 3 is shown. A flexible membrane 70 has a forward edge 72 and rearward edge 74 and a pair of essentially parallel side edges 76a & 76b. Membrane 70 is constructed of a flexible fabric which is

non-uniform in stiffness, such as LYCRA or POLARTEC. A pad 78, which is preferably constructed of a thin layer of foam, is positioned adjacent the bottom side of membrane 70. Foam pad 78 can be manufactured using a range of thickness variations, along with various hole patterns, to further control the areas of contact with the seated person. A second membrane 80, having a front edge 82 and rear edge 84 and a pair of essentially parallel side edges 86 and 86b, is positioned beneath pad 78. Membrane 80 is also constructed from a flexible fabric which is non-uniform in stiffness. Beneath membrane 80 is a second pad 88 constructed from a thin layer of foam. Finally, a third flexible membrane 90 having a front edge 92, and a rear edge 94, and a pair of essentially parallel side edges 96a and 96b is positioned beneath pad 88. The sling seat is formed by attaching side edges 76a, 86a, and 96a together by conventional means, such as sewing, and also side edges 76b, 86b, and 96b to form sling seat 69. Seat 69 is then suspended between a pair of supports by attaching edges formed at 76a, 86a, 96a and 76b, 86b, 96b. By varying the physical properties of each of the layers, a variety of seats with desired characteristics can be obtained. In this arrangement, membranes 70, 80, and 90 are always in tension, while the pads 78 and 88 held between the membranes are in compression.

This seat forms a concave surface which surrounds the contour of the person seated upon it, as the membrane and foam layers are pliable. However, sometimes it is desirable to limit the deflection of the seat for support purposes. This is accomplished by the use of a stiffener layer 98 which may be sandwiched between the layers. Stiffener 98, which may be constructed from a polycarbonate plastic sheet such as LEXAN having a thickness of approximately 0.125 inches, contains a cutout section 99 which comfortably accommodates the ischial tuberosities and sacrum of the body, while stiffener 98 provides rigid support beneath the femurs to assist the person when rising from the seat. Stiffener 98 also strengthens the seat for durability and handling.

Referring now to FIG. 8, another alternative embodiment of a sling seat 100 similar to that of FIG. 4 is shown. A flexible membrane 102 has a forward edge 104 and a peripheral edge 106. Edge 106 consists of a pair of essentially parallel sides 106a connected by a curved side 106b. In this embodiment, membrane 102 is constructed of a suitable sheet rubber, such as neoprene, which is non-uniform in stiffness. Membrane 102 is suspended along its peripheral edge 106 to form sling seat 100.

Within the interior of membrane 102, a pair of apertures 108 are positioned to approximate the positions of the ischial tuberosities of a person sitting in seat 100. Extending radially from each of apertures 108 is found a series of small oval perforations 110. The area 112 of membrane 102, between apertures 108 serves to provide support for the pubic arch of the person seated in this seat, as the pubic arch is a sensitive part of the body and pressure on it must be carefully controlled by sufficient deflection downwardly to avoid distress. The essence of the design of the present invention is to achieve gentle contact without pressing with excessive force against the sensitive pubic arch.

In the embodiment shown, perforations 110 are arranged in a series of concentric circles extending outwardly from apertures 108. Within each circle, perforations 110 are arranged in a sunburst pattern. Perforations 110 are staggered from one circle to another. The sunburst pattern increases flexibility in the circumferential direction, thus enhancing radial expansion of membrane 102. Apertures 108 and perforations 110 allow membrane 102 to more

comfortably accommodate the ischial tuberosities by more efficiently distributing the body weight. Different patterns of perforations 110 can be employed to accomplish this distribution.

FIG. 9 shows an alternative embodiment of the seat shown in FIG. 8. Seat 120 consists of a flexible membrane 122 having a front edge 124 and a peripheral edge 126. Edge 126 consists of a pair of essentially parallel sides 126a connected by a curved side 126b. Membrane 122, which is constructed from a suitable sheet rubber such as neoprene, contains a pair of recessed sections 128 which have been molded into membrane 122 (see FIG. 10). The area 132 of membrane 122 between sections 128 acts as a support for the pubic arch.

Recessed sections 128 each contain a series of perforations 130 which are arranged in a series of concentric circles. Sections 128, like apertures 108 shown in FIG. 8, allow for the accommodation of the ischial tuberosities of a person seated in seat 120. The concentric circular pattern can also be used in the embodiment shown in FIG. 8, as it increases the vertical drop of membrane 102, thus allowing membrane 102 to form cups to more comfortably support the ischial tuberosities.

FIG. 11 shows another alternative embodiment of a sling seat manufactured according to the present invention. Seat 140 is similar to the embodiments shown in FIGS. 4 and 5. However, seat 140 includes a membrane 142 located beneath the pubic arch of the seated person for the purpose of creating pressures and to also provide vertical lift to support the person's weight. Membrane 142 is supported along the periphery 144 at the rear of seat 140 and is affixed at an area 146 in the central region of seat 140. Preferably, membrane 142 is Y-shaped and oriented such that the coccyx and ilium of the seated person is located in an area 148 between arms 142a and 142b of membrane 142. Also located on seat 140 are a pair of wedges 150. Wedges 150, which are constructed of a stiff material, are located along periphery 144 on either side of membrane 142 and are constructed such that they are angled at preferably a 45° angle from periphery 144 toward the central region of seat 140. Wedges 150 are used to properly position the hip bones of the seated person forward and also to keep the sacrum away from the back edge of seat 140, aiding in positioning the body in the seat for optimum comfort. Arms 142a and 142b are anchored at the inner central edges of wedges 150.

FIG. 12 shows an embodiment of the seat of FIG. 3 in which no frame is used to support the sling seat. Membrane 170 is preferably constructed from a flat sheet of a flexible fabric of a non-uniform stiffness, as is disclosed in FIG. 3, having a pair of parallel edges 172. Edges 172 are attached to a cover 174. Cover 174 is preferably a canvas bag made from a fabric such as CORDURA. Edges 172 are sewn along upper edges 176 of cover 174 such that membrane 170 is stretched across the top surface 178 of cover 174. Cover 174 is then stretched over a core 180. To ensure proper tensioning of membrane 170, elastic straps 181 are used to wrap under core 180. Core 180 is preferably composed of a layer of a semi-rigid composite foam such as L-380XLPE foam. Core 180 may also contain a series of perforations 182 to control its stiffness.

This combination forms an "invisible" frame which helps to avoid injury if a person is not properly fitted or seated in the seat. The bony points of the body such as the coccyx, trochanter, and sacrum may come into contact with a rigid frame, thus causing possible severe injury. The seat taught in FIG. 12 can avoid this possibility, which can be a serious problem with wheelchair patients.

FIG. 13 shows an embodiment of a seat manufactured according to the principles of the present invention. Seat 200 consists of a top layer 202 having a curved front end 204 along with a pair of apertures 206 which allow for comfortable accommodation of the ischial tuberosities of the user. In addition, a plurality of circular apertures 208 may be located along the central area of layer 202 between apertures 206 and front end 204 to provide ventilation. Layer 202 is preferably constructed from a soft foam, such as an open cell polyurethane.

Adjacent layer 202 in seat 200 is a layer 210. Layer 210, which is essentially planar, contains a pair of apertures 212 which correspond to apertures 206 in layer 202. Surfaces 212a of apertures 212 may be tapered inwardly, as can be seen in FIG. 13, to assist in proper location of the ischial tuberosities. Layer 210, which is preferably constructed from a semi-rigid foam such as VOLTEK L200 cross-linked polyethylene, also contains a series of apertures 214, similar to apertures 208 in layer 202, which assist in providing ventilation for seat 200. Finally, layer 210 also contains a plurality of small perforations 216 which provide stiffness control for layer 210 at the proximal thigh and trochanter areas.

A sheet rubber layer 218 is positioned adjacent layer 210 away from top layer 202 within seat 200. Layer 218, which is preferably neoprene rubber, contains a plurality of apertures 220 corresponding to apertures 212 and 206 of layers 210 and 202, respectively. Layer 218 also contains a cutout section 222 located along each outer edge to accommodate the trochanters of the user of seat 200. In addition, layer 218 contains a pair of extensions 224a and 224b, which, together with a support member 226, which separates apertures 220, form a Y-shaped support, which is generally indicated at 228. Support 228 provides tension support and enhances weight distribution for the user of seat 200 by properly positioning the coccyx and ilium. Layer 218 also contains a plurality of perforations 230 which provide stiffness reduction at the proximal thigh.

Situated below layer 210 is a median divider device 232, preferably constructed from VOLTEK L-200, which provides stability for the knees of the user of seat 200 by correctly positioning the legs of the user. Device 232 is preferably adhesively affixed to the underside of layer 210 centered along its front edge.

A foam cushion 234 is positioned adjacent sheet layer 218 on the side opposite layer 210. Foam cushion 234 is preferably a composite device, constructed from different foam materials having different physical properties which are selected to match the vertical deflection of seat 200 required for the different body parts of the user. In the embodiment shown in FIG. 13, cushion 234 is composed of separate foam sections 234a, 234b, 234c and 234d. Section 234a supports the ilium, section 234b supports the mid-back, section 234c supports the proximal thigh and trochanter regions, and section 234d supports the legs of the user. Cushion 234 contains an elliptical cutout opening on region 236 which preferably contains a surface 236a which tapers outwardly from a lower surface 236b in the direction of layer 218.

Cushion 234 also contains a recessed area 238 along its rear edge which comfortably accommodates the coccyx of the user of seat 200. Finally, cushion 234 contains a plurality of apertures 240 similar to apertures 208, 214 of layers 202, 210 respectively which help to provide ventilation for seat 200.

Adjacent cushion 234 is a stiffener plate 242. Plate 242 provides support which allows seat 200 to act as a sling seat

when it is placed on an existing chair or support such as a wheelchair. Plate 242, which is constructed from a relatively thin rigid material such as plywood, a hard plastic, or a high impact polystyrene sheet, contains an elliptical opening 244 comparable to cutout region 236 in foam cushion 234. Plate 242 insures that cushion 234 stays flat and also supports the back section under the coccyx of the user of seat 200. Plate 242 also includes a series of apertures 246 which provide ventilation for seat 200.

In some instances where seat 200 will not fit properly into a wheelchair, a booster device 248 can often be employed to raise the hips of the user above the side rails of the wheelchair. Device 248, which is preferably constructed from a rigid material such as VOLTEK L200, contains an elliptical opening 250 which is comparable to openings 244, 236 in plate 242 and cushion 234 respectively, which tapers in the same manner as cutout region 236 in cushion 234.

Finally, booster device 248 may contain a plurality of raised protrusions 252 which fit within apertures 246 of plate 242 to ensure accurate positioning of booster device 248 in relation to seat 200.

FIG. 14a and b illustrate a removable cover system for use with the seat of FIG. 13. Referring now to FIG. 14a, a removable protective cushion bag 260 is shown. Bag 260, which is preferably constructed from a water resistant and low-friction material such as CORDURA, contains a zipper 262 which is affixed along its rear end such that seat 200 can be easily inserted into bag 260 to protect it from any debris or liquids which may tend to soil seat 200 if unprotected. Bag 260 also contains a series of apertures 264 to allow for air circulation and ventilation. Affixed on the side of bag 260 is an indicator 266, which when aligned with a mark on the wheelchair, enables seat 200 to be placed in exactly the same position on the wheelchair each time after it has been removed.

FIG. 14b shows a variation of cushion bag 260, designated as a slip cover 260a, which can be used with the seat of the present invention. Cover 260a has a front flap 268 which is folded over seat 200 after it is inserted into cover 260a and fastened to the underside using a removable attachment means such as VELCRO (not shown). Cover 260a also contains a rubber sheet 270 attached to the underside of the top of cover 260a for added strength and durability. Sheet 270, which is preferably manufactured from neoprene, may also contain apertures 272 to accommodate the ischial tuberosities or any irregular bony points of the user of seat 200.

FIG. 15 shows a separate cosmetic cover 274 which may be used as an additional cover over bag 260 or cover 260a as further protection from the elements of the environment of use of seat 200. Cover 274, which preferably manufactured from a strong, flexible, washable fabric such as LYCRA or POLARTEC, is stretched over seat 200 and bag 260 or cover 260a and is held in place by an elastic cord 276, which holds cover 274 tightly in place about seat 200.

While this invention has been shown and described in terms of several preferred embodiments thereof, it will be understood that this invention is not limited to any particular embodiment and that many changes and modifications may be made without departing from the true scope and spirit of the invention as defined in the appended claims.

What is claimed is:

1. A sling seat, comprising:

a plurality of flexible layers of material of non-uniform stiffness, with each layer having a top side, a bottom side, a front edge, a rear edge, and a pair of generally

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- parallel side edges, with each of said side edges of said layers fastened together to form a pair of generally parallel side seams;
- at least one flexible pad located between each of said flexible layers of material;
- a stiffener layer located between said flexible layers containing a cutout section for accomodating the ischial tuberosities of a person seated on said seat;
- and means for seperately supporting each side seam to form a sling seat.
2. The seat of claim 1, wherein said flexible layers of material are held in tension.
3. The seat of claim 1, wherein said flexible pads are held in compression.

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4. The seat of claim 1, wherein said flexible pads are constructed from foam rubber.
5. The seat of claim 1, wherein said flexible pads are constructed from sheet rubber which contains a plurality of protrusions for spacing said flexible layers apart.
6. The seat of claim 2, wherein the tension forces within said material are multi-directional.
7. The assembly of claim 1, wherein said stiffener layer is constructed from a polycarbonate plastic.
8. The seat of claim 1, wherein of at least one said flexible layers is constructed from LYCRA.

* * * * *

posed product infringes claim 1 under the doctrine of equivalents.

[13, 14] Because this court's interpretation of the claims makes it unlikely that Glaxo will succeed in its infringement showing, this court need not address the other factors for a preliminary injunction. *Reebok Int'l Ltd. v. J. Baker, Inc.*, 32 F.3d 1552, 1556, 31 USPQ2d 1781, 1783-84 (Fed.Cir.1994). This court notes, however, that the district court determined that Ranbaxy would not be able to compensate Glaxo in the event of infringement. The record support for this assessment considers Glaxo's anticipated lost sales if its Cefitin® product faced any generic competition. *Glaxo Group Ltd.*, slip op. at 44. The purpose of compensatory damages is not to punish the infringer, but to make the patentee whole. *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 507, 84 S.Ct. 1526, 12 L.Ed.2d 457, 141 USPQ 681, 694 (1964) ("The question to be asked is 'Had the infringer not infringed, what would the patent holder . . . have made?' "). Thus, patent damages are not paid for a total amount of lost sales. Rather, if Ranbaxy were somehow found liable for infringement of the '181 patent, it would owe Glaxo either a reasonable royalty or lost profits on Glaxo's lost sales. Glaxo, however, made no showing of its anticipated lost profits. The record, therefore, does not show that Ranbaxy would be unable to compensate Glaxo for any potential infringement of the '181 patent.

Furthermore, under this court's claim construction, Glaxo is unlikely to prove that Ranbaxy's proposed cefuroxime axetil product infringes the '181 patent. Thus, the record does not support a showing that sale of Ranbaxy's product would irreparably harm Glaxo.

In its claim interpretation, the district court found "that Glaxo demonstrates that the balance of hardships tips, perhaps just

slightly, in its favor." *Glaxo Group Ltd.*, slip op. at 48. Stated otherwise, the district court acknowledged that this case presented a close call even under its claim interpretation. Under this court's conclusions, the likelihood of success and irreparable harm factors now fall in Ranbaxy's favor. Therefore, under this court's claim interpretation, the record no longer supports a preliminary injunction. This thus court vacates the district court's order entering a preliminary injunction against Ranbaxy and remands this case for further proceedings.

CONCLUSION

The district court made an error of law in its claim construction and thereby abused its discretion in granting a preliminary injunction enjoining Ranbaxy from offering for sale or selling cefuroxime axetil products under Ranbaxy's ANDA.

COSTS

Each party shall bear its own costs.

VACATED and REMANDED.



Michael L. McGINLEY,
Plaintiff-Appellant,

v.

FRANKLIN SPORTS, INC., Defendant-
Cross Appellant.

Nos. 00-1324, 01-1113.

United States Court of Appeals,
Federal Circuit.

Aug. 21, 2001.

Rehearing and Rehearing En Banc
Denied Oct. 17, 2001.

Patentee brought action against alleged infringer relating to patent on in-

structional pitching device in the form of a regulation baseball with specific "finger placement indicia" for teaching students how to grasp a baseball for throwing different types of pitches. The United States District Court for the District of Kansas, John W. Lungstrum, J., granted judgment of invalidity, 92 F.Supp.2d 1216. Patentee appealed. The Court of Appeals, Clevenger, Circuit Judge, held that: (1) doctrine of equivalents applied to patentee's claim limitation; (2) alleged infringer's finger-shaped markings on accused baseball were structural equivalents of tapered egg-shaped indicia described in patent; and (3) patentee presented sufficient evidence for jury to conclude that patent claims based on combination of prior art were not obvious.

Reversed in part and affirmed in part.

Michel, Circuit Judge, filed a dissenting opinion.

1. Patents ⇨324.5

Court of Appeals resolves patent claim interpretation disputes without deference to the district court.

2. Patents ⇨237

Doctrine of equivalents applied to patentee's claim limitation, in patent relating to "finger placement indicia" on baseball; although alleged infringer asserted that claim limitation was not entitled to any range of equivalents whatsoever, patentee was statutorily guaranteed a range of equivalents extending beyond that which was explicitly disclosed in the patent document itself. 35 U.S.C.A. § 112.

3. Patents ⇨226.7

Drafters of means-plus-function claim limitations are statutorily guaranteed a range of equivalents extending beyond that which is explicitly disclosed in the patent document itself. 35 U.S.C.A. § 112.

4. Patents ⇨237

Alleged infringer's finger-shaped markings on accused baseball were structural equivalents of tapered egg-shaped indicia described in patent on instructional pitching device used to teach students how to grasp a baseball for throwing different types of pitches, as an artisan of ordinary skill would have made such a conclusion. 35 U.S.C.A. § 112.

5. Patents ⇨324.5

Court of Appeals reviews de novo a district court's legal conclusion that summary judgment of patent infringement was warranted. Fed.Rules Civ.Proc.Rule 56, 28 U.S.C.A.

6. Patents ⇨32

Throughout an obviousness determination, a patent retains its statutory presumption of validity and the movant for judgment of invalidity retains the burden to show the invalidity of the claims by clear and convincing evidence as to underlying facts. 35 U.S.C.A. §§ 103(a), 282.

7. Patents ⇨312(5)

Patentee presented sufficient evidence for jury to conclude that patent claims based on combination of prior art were not obvious, in lawsuit relating to patent on instructional device on baseball, even though alleged infringer presented evidence that combination was obvious.

8. Patents ⇨314(5)

Although the ultimate determination of obviousness of a patent is a question of law, there are factual issues underlying the ultimate obviousness decision. 35 U.S.C.A. § 103(a).

9. Patents ⇨16(1), 36.1(1)

An obviousness analysis is based on four underlying factual inquiries: (1) the scope and content of the prior art; (2) the

differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any, of nonobviousness of the patent. 35 U.S.C.A. § 103(a).

10. Federal Courts ⇨765

Court of Appeals reviews a grant of judgment as a matter of law without deference to the district court.

11. Federal Civil Procedure ⇨2603, 2608.1

Entry of judgment as a matter of law is inappropriate unless a jury's verdict is unsupported by substantial evidence or premised on incorrect legal standards.

12. Patents ⇨324.5, 324.55(4)

When analyzing the correctness of a judgment as a matter of law overturning a jury verdict of nonobviousness of a patent, the Court of Appeals must consider the facts before the district court, and then determine whether the district court's ultimate judgment on obviousness is correct as a matter of law; when re-creating the facts as they may have been found by the jury, and in applying the four factors used in making an obviousness determination to the evidence of record, the Court of Appeals assesses the evidence in the light most favorable to the verdict winner. 35 U.S.C.A. § 103(a).

13. Patents ⇨36(1)

Whether a patent claim is obvious depends upon the answer to several factual questions and how the factual answers meld into the legal conclusion of obviousness vel non. 35 U.S.C.A. § 103(a).

14. Patents ⇨16(4), 26(1)

The genius of invention is often a combination of known elements which in hindsight seems preordained, so, to prevent hindsight invalidation of patent claims, the law requires some teaching,

suggestion, or reason to combine cited references; when the art in question is relatively simple, the opportunity to judge by hindsight is particularly tempting, and consequently, the tests of whether to combine references need to be applied rigorously. 35 U.S.C.A. § 103(a).

15. Patents ⇨16.13

Whether a motivation to combine prior art references has been demonstrated is a question of fact, in the context of a determination of obviousness in a patent. 35 U.S.C.A. § 103(a).

16. Patents ⇨26(1)

When making a determination of obviousness in a patent, the factual inquiry of whether to combine references must be thorough and searching. 35 U.S.C.A. § 103(a).

17. Patents ⇨16(1), 26(1)

The assessment of whether to combine references, in the context of a determination of obviousness in a patent, may be viewed conceptually as a subset of the scope and content of the prior art factor, in the four-factor obviousness test; however, accurate assessment of whether to combine references may require attention to the other three factors. 35 U.S.C.A. § 103(a).

18. Patents ⇨16(3), 26(1)

In the context of a determination of obviousness in a patent, the level of skill in the art may inform whether the artisan would find a suggestion to combine in the teachings of an exemplar of prior art; where the level of skill is high, one may assume a keener appreciation of nuances taught by the prior art, and similarly, appreciation of the differences between the claims in suit and the scope of prior art references, a matter itself informed by the operative level of skill in the art, informs

the question of whether to combine prior art references. 35 U.S.C.A. § 103(a).

19. Patents ⇨16.5(1)

In the context of a determination of obviousness in a patent, references that teach away cannot serve to create a *prima facie* case of obviousness.

20. Federal Civil Procedure ⇨2608.1

When a jury is supplied with sufficient valid factual information to support the verdict it reaches, the jury's factual conclusion may not be set aside by an order for judgment as a matter of law.

21. Patents ⇨310.11

Denial of patentee's motion to amend his complaint was warranted, in lawsuit relating to patent on instructional device on baseball, since patentee filed motion more than one year after filing his initial complaint and almost two months after deadline that had been set by district court for filing a motion to join additional parties. Fed.Rules Civ.Proc.Rule 15, 28 U.S.C.A.

22. Courts ⇨96(4, 7)

District court decision to grant or deny a motion for leave to join a party involves a procedural question that raises no special issues relating to patent law, and therefore the law of the circuit in which the district court sits applies. Fed. Rules Civ.Proc.Rule 15, 28 U.S.C.A.

23. Federal Courts ⇨817

In the Tenth Circuit, a trial court's decision to grant or deny a motion for leave to join a party is reviewed for an abuse of discretion. Fed.Rules Civ.Proc. Rule 15, 28 U.S.C.A.

24. Federal Civil Procedure ⇨1951, 1991

Trial courts are given broad latitude in managing and scheduling cases.

25. Patents ⇨324.1

Alleged infringer failed to preserve for appeal trial court's alleged error of precluding its corporate representative from testifying as to its alleged good faith belief that patent on instructional device on baseball was invalid, on basis that representative was not qualified as an expert, since alleged infringer failed to make offer of proof as to what corporate representative would have said. Fed.Rules. Evid. Rule 103, 28 U.S.C.A.; Fed.Rules Civ. Proc.Rule 26, 28 U.S.C.A.

26. Patents ⇨324.54

In a patent infringement action, the denial of a motion for a new trial by a district court sitting in the Tenth Circuit is a procedural issue not unique to patent law, and is therefore reviewed under the Tenth Circuit's abuse of discretion standard.

Kip D. Richards, Walters Bender Strohhahn & Vaughn, P.C., of Kansas City, MO, argued for plaintiff-appellant.

Joseph B. Bowman, Shook, Hardy & Bacon L.L.P., of Kansas City, MO, argued for defendant-cross appellant. Of counsel was Daniel P. Devers.

Before MAYER, Chief Judge, MICHEL and CLEVINGER, Circuit Judges.

CLEVINGER, Circuit Judge.

This is a patent infringement suit in which Michael L. McGinley charges Franklin Sports, Inc. ("FSI") with willful infringement of claims 1, 2, 6, and 7 of U.S. Patent No. 5,407,193 ("the '193 patent"). On summary judgment, the United States District Court for the District of Kansas ruled in favor of McGinley on the issue of infringement, and the case proceeded to

trial on the issues of validity and willfulness. The jury found that the asserted claims were not invalid and were willfully infringed. On a subsequent motion filed by FSI for judgment as a matter of law ("JMOL"), the trial court set aside the jury verdict on validity, holding that the asserted claims of the '193 patent are invalid as obvious pursuant to 35 U.S.C. § 103(a).

McGinley appeals the district court's grant of JMOL of invalidity and the earlier denial of McGinley's motion for leave to amend the complaint to join his business, S.C. Products, Inc. ("SCP"), as an additional plaintiff. On cross-appeal, FSI challenges the district court's grant of summary judgment in favor of McGinley on infringement and the denial of its motion for a new trial on willfulness.

Because we conclude that the district court erred in finding that no reasonable jury could have reached a verdict of non-obviousness, we reverse the JMOL of invalidity. We affirm the district court's rulings in all other respects.

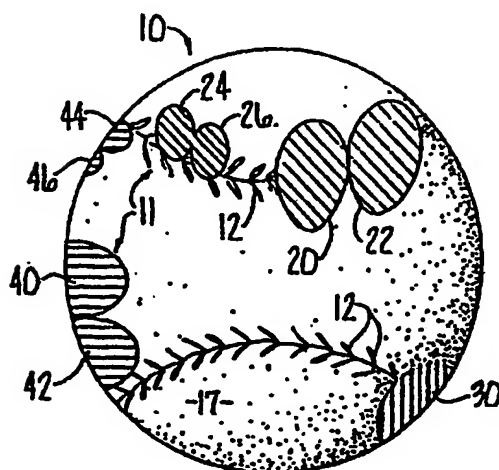
I

Background

The application for the '193 patent was filed on July 3, 1991, and the patent issued

on April 18, 1995. In general terms, the '193 patent discloses and claims an instructional pitching device in the form of a regulation baseball with specific "finger placement indicia" for teaching students how to grasp a baseball for throwing different types of pitches. With the endorsement of a famous professional baseball pitcher, McGinley's invention was marketed and distributed as the Roger Clemens Instructional Baseball ("RCIB"). FSI also manufactured and sold a baseball designed to teach students to throw different types of pitches. The accused device in this case, the Franklin Pitch Ball Trainer 2705 ("FSI's 2705 baseball"), was sold in the United States from at least as early as April 1995 to March 1999.

In the preferred embodiment of the claimed invention, an aspect of which is illustrated in the following figure, three sets of finger placement indicia 11 are positioned on the cover 17 of a regulation baseball 10. Each set of indicia 11 is intended to illustrate the placement of a student pitcher's index and middle fingers so as to throw a particular type of pitch (*e.g.*, two-seam fast ball, slider, curve ball, etc.).

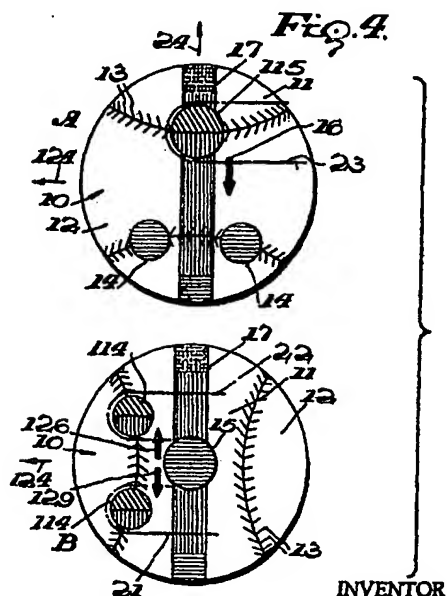


Indicia 11 are presented in two sizes, to allow the indicia intended for a left-handed student to be easily distinguished from the indicia intended for a right-handed student. The smaller indicia, exemplified by indicia 24 and 26, are intended for use by left-handed pitchers, while the larger indicia, as represented by indicia 20 and 22, are intended for use by right-handed pitchers. Moreover, indicia 11 are coded by coloring all indicia which are representative of a certain type of pitch in one color and indicia representative of another type of pitch in a different color. To further assist a student in learning how to throw a particular pitch, the indicia are shaped so as to indicate the relationship of the palm of the hand in grasping the ball. Specifically, the portion of each "egg-shaped" indicium to be situated closest to the palm is slightly tapered so as to indicate the correct orientation of the baseball in the palm. Although the preferred embodiment of the '193 patent makes no provisions for "thumb placement indicia," the written description of the '193 patent repeatedly states that the thumb is generally to be positioned on the baseball at a location opposite the corresponding set of finger placement indicia.

As originally filed in 1991, the claims of the '193 patent required that eight sets of finger placement indicia be provided on a single baseball pitching training device. Specifically, the four original claims all required the presence of indicia demarcating the placement of fingers for four specific types of pitches (*i.e.*, curve ball, two-seam fast ball, slider, and four-seam fast ball), for both left-handed and right-handed students. These claims were rejected on obviousness grounds in view of U.S. Patent No. 2,925,273 ("Pratt"), which had issued on February 16, 1960, more than thirty years before McGinley's filing date. Pratt was brought to the attention of the Patent and Trademark Office ("PTO") via an Information Disclosure Statement ("IDS") filed concurrently with McGinley's priority patent application by McGinley's counsel.

Like the claims originally filed by McGinley, Pratt disclosed, *inter alia*, a conventional baseball having multiple sets of finger placement indicia for teaching baseball players to throw different types of pitches. Specifically, in the embodiment illustrated in Figure 4 (shown below),

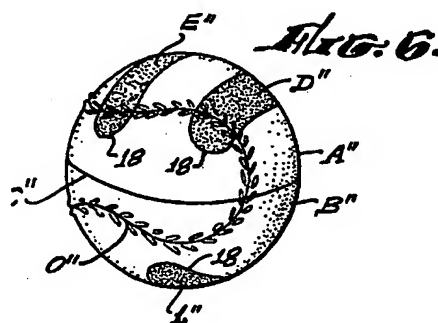
Pratt's written description disclosed the placement of finger and thumb placement indicia for three types of pitches (*i.e.*, fast ball, curve ball, and screw ball). Equatorial band 17 was an important feature of Pratt's claimed invention. When a student threw Pratt's baseball correctly, bands of complementary colors in the equatorial band would blend into a single color to provide a visual indication to the student that the ball had been thrown with proper rotation.



Although the similarities between Pratt's disclosure and McGinley's then-existing claims are striking, there are also a few differences between Pratt's teachings and McGinley's initially claimed invention. First, Pratt did not provide for different sets of indicia on a single ball for distinguishing between left-handed and right-handed students. Also, Pratt's finger placement indicia were described and illustrated as being circular, but "phantom lines" illustrating the placement of fingers 21, 22 and thumb 23 were included in the patent figures. These phantom lines, how-

ever, are not described in Pratt as actual markings on the baseball. In contrast, the finger placement indicia in the preferred embodiment of McGinley's invention are actually marked on the ball, and are "egg-shaped" and slightly tapered at one end to indicate the proper orientation of the ball with respect to the student's palm.

Another prior art reference which was brought to the attention of the PTO via McGinley's IDS was U.S. Patent No. 3,110,494 ("Morgan"), which issued on November 12, 1963. In contrast to Pratt and the '193 patent, which are based on using a conventional regulation baseball, Morgan describes a baseball training device using a lightweight and inexpensive baseball "replica" fabricated in the form of plastic or metallic hemispherical shells which occupy a minimum of space before use, but which can be easily assembled by gluing the two hemispherical halves together. In Figure 6 of Morgan (shown below) and the accompanying written description, a single set of finger-shaped marks D', E', and L' (for teaching proper placement of the forefinger, middle finger, and thumb, respectively) are provided on the baseball training device to teach a student how to throw a baseball with a particular curve or break.



Throughout the prosecution history of the '193 patent, McGinley's claims at issue in this case were rejected in view of Pratt on anticipation grounds. With respect to

Morgan, although this reference was before the PTO during the entire pendency of McGinley's patent application, it was never explicitly relied upon as a basis for a rejection based on a prima facie case of anticipation or obviousness.

Ultimately, in 1995, after a series of rejections, amendments, and responses (including a partially successful appeal to the Board of Patent Appeals and Interferences and the filing of a continuation application), the '193 patent issued with 14 claims. Ten of the issued claims (*i.e.*, claims 3-5 and 8-14) explicitly retain the original limitation requiring the inclusion of finger placement indicia on a single baseball pitching training device for both left-handed and right-handed students. These claims were not asserted in this case. Instead, McGinley asserted the remaining four claims (*i.e.*, independent claim 1 and dependent claims 2, 6, and 7) against FSI, alleging willful infringement by making and selling the 2705 baseball. The asserted claims read as follows in their entirety:

1. A baseball pitching training device for duplicating finger placement on a baseball by a student comprising:

a baseball cover;

a plurality of sets of finger placement indicia on said cover, said sets of indicia comprising:

a first set of indicia demarcating the placement of finger [sic] for throwing a first pitch;

a second set of indicia demarcating the placement of fingers for throwing, [sic] a second pitch;

a third set of indicia demarcating the placement of fingers for throwing a third pitch;

means for indicating the orientation of the baseball relative to the palm of the hand; and

means for coding said finger placement indicia sets for identification of each of said indicia associated with any one of said sets.

2. The device as claimed in claim 1 wherein said means for coding comprises a color for association with each indicia of a particular set.

6. The device as claimed in claim 1, wherein said means for indicating orientation comprises shaping said indicia to distinguish that portion of the baseball to be located proximate to the palm of the hand.

7. The device as claimed in claim 1 wherein said indicia are shaped to indicate a correct orientation of the baseball with respect to the palm of the hand.

'193 patent, col. 5, ll. 29-48; col. 5, ll. 61-64; col. 6, ll. 1-3.

The district court held a *Markman* hearing on January 21, 1999, and issued an order construing the disputed claims of the '193 patent shortly thereafter. *McGinley v. Franklin Sports, Inc.*, 45 F.Supp.2d 1141 (D.Kan.1999) (*McGinley I*). On cross-appeal, FSI challenges only the district court's interpretation of the claimed "means for indicating the orientation of the baseball relative to the palm of the hand." The district court construed the term as a means-plus-function limitation pursuant to 35 U.S.C. § 112, ¶ 6, and concluded that the corresponding structure included "a slight taper at the portion of each indicia situated closest to the palm of the hand, and any equivalents of such structure." *Id.* at 1146. FSI's position on appeal is that the claim limitation is not entitled to any range of equivalents whatsoever.

Based on its claim interpretation, the district court granted McGinley's motion for partial summary judgment on the issue of infringement on October 28, 1999. *McGinley v. Franklin Sports, Inc.*, 75 F.Supp.2d 1218, 1224-25 (D.Kan.1999)

(*McGinley II*). At the same time, however, the district court denied FSI's motion for partial summary judgment on validity, *id.* at 1225-32, finding disputed issues of material fact with respect to the obviousness issue. The case proceeded to trial, and on January 19, 2000, the jury returned a verdict in favor of McGinley, finding the '193 patent not invalid and willfully infringed.

FSI then filed a post-trial motion, seeking JMOL on the issues of validity and willfulness. In the alternative, FSI also moved for a new trial. On April 5, 2000, the district court set aside the jury's verdict and granted FSI's motion for JMOL on invalidity, concluding that "as a matter of law, plaintiff's patent is invalid as obvious in light of Pratt or the combination of Pratt and Morgan." Judgment was entered in favor of FSI, and this appeal followed, vesting us with jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II

Claim Interpretation

[1] As the first step of the infringement and validity analyses in this case, we resolve any claim interpretation disputes on appeal, without deference to the district court. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351, 57 USPQ2d 1747, 1751-52 (Fed.Cir.2001); *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1174-75 (Fed.Cir.1998) (en banc); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979, 34 USPQ2d 1321, 1329 (Fed.Cir.1995) (en banc), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577, 38 USPQ2d 1461 (1996).

The only claim interpretation dispute remaining on appeal concerns the limitation in all of the asserted claims requiring "means for indicating the orientation of the

baseball relative to the palm of the hand." There is no dispute that this term should be construed as a means-plus-function limitation pursuant to 35 U.S.C. § 112, ¶6, and that the claimed function is "indicating the orientation of the baseball relative to the palm of the hand." The only dispute on appeal concerns identification of the corresponding structure.

[2] The district court ruled that the corresponding structure included egg-shaped indicia having "a slight taper at the portion of each indicia situated closest to the palm of the hand, and any equivalents of such structure." *McGinley I* at 1146. In contrast, FSI's position is that the claim limitation is not entitled to any range of equivalents whatsoever, on the basis that the written description of the '193 patent discloses only egg-shaped indicia with tapered ends, and that undisclosed equivalents cannot be construed to be within the scope of a patent claim. In support for its position, FSI points out that the only orientation means explicitly described in the '193 patent is a slight taper to the finger placement indicia, which are to be understood as being shaped in the form of egg-shaped ovals by inspecting the figures of the '193 patent:

To further assist the student the indicia are shaped so as to indicate the relationship of the palm of the hand in grasping the ball. The portion of each indicia intended to be situated closest to the palm is slightly tapered thereby to assist the student in achieving correct orientation of the ball in the palm.

%'193 patent, col. 5, ll. 16-22.

[3] FSI's argument on this point is wholly without merit, for it misunderstands the statute. Drafters of means-plus-function claim limitations are statutorily guaranteed a range of equivalents extending beyond that which is explicitly disclosed in the patent document itself:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, *and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.*

35 U.S.C. § 112, ¶ 6 (1994) (emphasis added). We therefore affirm the district court's claim construction.

III

Infringement

[4] This brings us to FSI's cross-appeal from the district court's grant of McGinley's motion for summary judgment of infringement. At the summary judgment stage, the district court compared the asserted claims of the '193 patent as they had been construed in *McGinley I* to undisputed evidence concerning FSI's 2705 baseball. In the accused FSI 2705 baseball, the finger placement indicia are in the shape of finger-like outlines that are blunted at the end furthest from the fingertips.

Summary judgment is appropriate "if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed.R.Civ.P. 56(c). For purposes of the motion, "[t]he evidence of the nonmovant is to be believed, and all justifiable inferences are to be drawn in his favor." *Anderson v. Liberty Lobby, Inc.*, 477 U.S.

242, 255, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986).

[5] Upon reviewing the record before it at that stage of the litigation, the district court concluded that FSI had not demonstrated the existence of any genuine issue as to any material fact concerning infringement. Specifically, the finger-shaped markings on the accused FSI 2705 baseball were found by the district court to be functionally identical and structurally equivalent to the tapered egg-shaped indicia disclosed in the '193 patent:

Although the markings on defendant's ball are shaped somewhat differently than those found on plaintiff's product,¹ the court concludes that the difference is insubstantial: an elongation of the finger indicia, coupled with "blunting" the ends of each mark, as opposed to tapering them, adds nothing of significance to the structure disclosed in plaintiff's patent specification. Both types of indicia show the student precisely how to grip the baseball, and the difference between the structure used to accomplish this function is, at best, an insignificant alteration.

McGinley II at 1224 (footnote not in original). We review *de novo* the district court's legal conclusion that summary judgment of infringement was warranted in this case. *Ethicon Endo-Surgery, Inc. v. United States Surgical Corp.*, 149 F.3d 1309, 1315, 47 USPQ2d 1272, 1275 (Fed. Cir.1998).

On appeal, FSI does not quibble with the district court's conclusion that the finger-shaped markings on the accused FSI

1. We note that the district court incorrectly referred to "plaintiff's product" repeatedly in its memorandum and order granting summary judgment of infringement, where "plaintiff's asserted claims" were clearly meant to be referenced instead. See, e.g., *McGinley II* at 1224. Upon reviewing the

record, we conclude that these erroneous statements were harmless, since there is no contention by any party that any significant differences exist between McGinley's commercial embodiment ("the RCIB") and relevant aspects of the asserted claims.

2705 baseball are structural equivalents of the tapered egg-shaped indicia described in the '193 patent. Instead, FSI simply argues that the "means for orienting" limitation in the asserted claims is not entitled to a range of equivalents at all. Since we have already rejected that argument, FSI's cross-appeal on infringement fails as well. Moreover, our review of the record reveals that FSI did not present any non-conclusory evidence in opposition to McGinley's summary judgment of infringement which would tend to indicate that an artisan of ordinary skill would *not* consider the finger-shaped indicia on the accused FSI 2705 baseball to be structural equivalents of the tapered egg-shaped indicia explicitly described in the '193 patent. Therefore, we affirm the district court's grant of summary judgment of infringement.

IV

Obviousness

[6, 7] A patent is invalid for obviousness if "differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a) (1994). "Throughout the obviousness determination, a patent retains its statutory presumption of validity, *see* 35 U.S.C. § 282, and the movant retains the burden to show the invalidity of the claims by clear and convincing evidence as to underlying facts." *Rockwell Int'l. Corp. v. United States*, 147 F.3d 1358, 1364, 47 USPQ2d 1027, 1031-32 (Fed.Cir.1998).

[8, 9] Although it is well settled that the ultimate determination of obviousness is a question of law, it is also well understood that there are factual issues underly-

ing the ultimate obviousness decision. *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479, 44 USPQ2d 1181, 1183 (Fed.Cir.1997). Specifically, the obviousness analysis is based on four underlying factual inquiries, the well-known *Graham* factors: (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any, of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966); *Kegel Co., Inc. v. AMF Bowling, Inc.*, 127 F.3d 1420, 1430, 44 USPQ2d 1123, 1130 (Fed.Cir.1997).

At trial, FSI argued, *inter alia*, that the asserted claims of the '193 patent were obvious in view of either Pratt alone, or in view of Pratt in combination with Morgan. FSI's obviousness theories are best summarized in its own words from its opening brief on appeal:

The only element of the asserted claims that is not clearly anticipated by the Pratt patent is the finger shaped marks that orient the ball with respect to the palm of the user's hand. However, this feature is obvious in light of the lines indicating finger placement on the drawings of the Pratt patent. Moreover, the concept of a set of finger marks to orient the ball is clearly taught in the Morgan patent. It would have been obvious to one of ordinary skill in the art to substitute the finger marks of the Morgan patent for the marks of the Pratt patent. Or, stated another way, it would have been obvious to place three sets of marks on the Morgan ball in light of the teaching of Pratt.

In other words, FSI argued to the jury that the "missing element" in Pratt (*i.e.*, the "means for orientation") can be found either in the "phantom lines" of Pratt or in Figure 6 of Morgan. McGinley argued at

trial that there was no motivation to combine the prior art as suggested by FSI, and that even if such a motivation to combine had been demonstrated, that the commercial success of both McGinley's RCIB and FSI's accused 2705 baseball constituted sufficient evidence of secondary considerations that would negate any prima facie showing of obviousness.

The jury agreed with McGinley. Specifically, in the special verdict form used in this case, the jury answered three questions that are relevant to this appeal in favor of McGinley. First, the jury found that FSI had not proven by clear and convincing evidence that each of the elements of the invention defined in claims 1, 2, 6 and 7 of the '193 patent is disclosed in Pratt. This was a factual finding. *In re Beattie*, 974 F.2d 1309, 1311, 24 USPQ2d 1040, 1041 (Fed.Cir.1992) ("What a reference teaches is a question of fact.").

Second, the jury found that FSI had not proven by clear and convincing evidence that any of the asserted claims were invalid as being obvious in view of Pratt alone. Finally, the jury found that FSI had not proven by clear and convincing evidence that any of the asserted claims were invalid as being obvious in view of a combination of Pratt and Morgan. These latter two findings by the jury are directed to the ultimate legal issue of obviousness, and provide no insight as to the jury's findings with respect to the underlying factual underpinnings. The parties do not object to the phrasing of the questions that were posed to the jury in the verdict form, nor do they challenge the district court's comprehensive jury instructions on obviousness.

In its motion for JMOL, FSI argued that no reasonable jury could have concluded that the asserted claims were not

obvious in view of either Pratt alone or in view of Pratt in combination with Morgan. The district court agreed, and granted FSI's motion for JMOL. Specifically, the court found that "no reasonable jury could conclude that the motivation to combine Pratt and Morgan did not exist." Moreover, the district court "simply [did] not believe that the evidence regarding secondary considerations [was] sufficient to overcome its firm conclusion that, as a matter of law, plaintiff's patent is invalid as obvious in light of Pratt or the combination of Pratt and Morgan." In sum, the district court concluded that "in light of Pratt alone, as well as in light of Pratt and Morgan in combination, the claims set forth in the '193 patent are invalid as obvious."²

[10, 11] We review a grant of JMOL without deference to the district court. *Tex. Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1563, 39 USPQ2d 1492, 1496 (Fed.Cir.1996). Entry of JMOL is inappropriate unless the jury's verdict is unsupported by substantial evidence or premised on incorrect legal standards. *Applied Med. Res. Corp. v. United States Surgical Corp.*, 147 F.3d 1374, 1376, 47 USPQ2d 1289, 1290-91 (Fed.Cir.1998); accord *Jackson v. City of Albuquerque*, 890 F.2d 225, 230 (10th Cir.1989); *J.I. Case Credit Corp. v. Crites*, 851 F.2d 309, 311 (10th Cir.1988) (noting that JMOL is appropriate "only if the proof is all one way or so overwhelmingly preponderant in favor of the movant as to permit no other rational conclusion").

[12] In analyzing the correctness of a JMOL overturning a jury verdict of nonobviousness, we must consider the facts before the district court, and then determine whether the district court's ultimate judgment on obviousness is correct as a matter

2. We interpret this statement as referring

solely to the asserted claims.

of law. *Richardson-Vicks*, 122 F.3d at 1479, 44 USPQ2d at 1183. In re-creating the facts as they may have been found by the jury, and in applying the *Graham* factors to the evidence of record in this case, we assess the evidence in the light most favorable to the verdict winner, in this case McGinley. *Id.*; accord *Lucas v. Dover Corp.*, 857 F.2d 1397, 1400 (10th Cir.1988) (“In determining whether the grant of a motion for [JMOL] is appropriate, the court must view the evidence and indulge all inferences in favor of the party opposing the motion and cannot weigh the evidence, consider the credibility of witnesses or substitute its judgment for that of the jury.”) (internal quotations omitted).

[13] Whether a patent claim is obvious under section 103 depends upon the answer to several factual questions and how the factual answers meld into the legal conclusion of obviousness vel non. In this case, we think that the central question is whether there is reason to combine the Pratt and Morgan references, because if the references are properly combined, it is certain that the claims are prima facie invalid for obviousness. If the jury was entitled to conclude that these two references should not be combined, then the asserted claims of the '193 patent cannot be invalid for obviousness in the light of the proposed combination. If those claims are not invalid under a combination of Pratt and Morgan, then, as a matter of logic, those claims cannot be invalid in the light of Pratt alone. We thus turn first to the issue of whether Pratt and Morgan must be combined.

[14] The genius of invention is often a combination of known elements which in hindsight seems preordained. To prevent hindsight invalidation of patent claims, the law requires some “teaching, suggestion or reason” to combine cited references. *Gambro Lundia AB v. Baxter Healthcare*

Corp., 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed.Cir.1997). When the art in question is relatively simple, as is the case here, the opportunity to judge by hindsight is particularly tempting. Consequently, the tests of whether to combine references need to be applied rigorously. See *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed.Cir.1999), *limited on other grounds by In re Gartside*, 203 F.3d 1305, 53 USPQ2d 1769 (2000) (guarding against falling victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher).

[15–18] Whether a motivation to combine prior art references has been demonstrated is a question of fact. *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348, 53 USPQ2d 1580, 1586 (Fed.Cir. 2000). The assessment of whether to combine references in a given case has sometimes been viewed conceptually as a subset of the first *Graham* factor, the scope and content of the prior art. See, e.g., *id.*; *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881–83, 886, 45 USPQ2d 1977, 1981–82, 1985 (Fed.Cir. 1998). Although that view is not incorrect, accurate assessment of whether to combine references may require attention to other *Graham* factors. For example, the level of skill in the art may inform whether the artisan would find a suggestion to combine in the teachings of an exemplar of prior art. Where the level of skill is high, one may assume a keener appreciation of nuances taught by the prior art. Similarly, appreciation of the differences between the claims in suit and the scope of prior art references—a matter itself informed by the operative level of skill in the art— informs the question of whether to combine prior art references. At bottom, in each case the factual inquiry whether to

combine references must be thorough and searching.

There is no question here that FSI presented sufficient evidence at trial from which a jury could have decided that one of ordinary skill in this case would have been motivated to combine Pratt and Morgan to produce a *prima facie* obvious invention. Specifically, FSI argued to the jury that the only elements of the asserted claims that are not clearly anticipated by Pratt are the finger-shaped marks that orient the ball with respect to the palm of the user's hand. Referring to the "phantom lines" in Pratt as suggestive of finger placement on the ball, FSI argued that one of ordinary skill would have been motivated to substitute the finger marks from the Morgan ball for the circular marks on Pratt, or alternatively to place three sets of marks on the Morgan ball in the light of Pratt's teachings. In addition, FSI argued that one of ordinary skill would have known to add the finger orientation means of the Morgan patent to Pratt by "filling in" the phantom lines in Pratt's drawings and treating them as finger orientation means.

But the jury did not hear a one-sided case on the issue of obviousness generally, and in particular on whether to combine Pratt and Morgan. As FSI conceded at oral argument, McGinley presented reasons to the jury to reject a combination of the references. McGinley argued many grounds to support his contention that the asserted claims are not obvious in the light of Pratt and Morgan. To counter FSI's claim that those references should be combined to render McGinley's "means for orientation" obvious, McGinley pointed to specific differences between the prior art and the asserted claims. For example, Morgan does not disclose the required markings for at least three different kinds of pitches, as do the asserted claims. And

Morgan does not disclose markings on a real baseball, as do Pratt and the asserted claims. We recount the gist of this testimony below.

The jury heard from Mr. Charles Quinn, FSI's vice president of marketing and corporate representative at trial. Quinn testified in detail as to the express teachings of Pratt and Morgan, and as to the differences between these references and the asserted claims. For example, he conceded that the markings on the baseball in Pratt's invention were circular, and therefore incapable of indicating orientation. Trial Tr. Vol. 2, p. 140. He also acknowledged that the "phantom lines" in Pratt's drawings were not actually markings on a baseball. Trial Tr. Vol. 2, pp. 177-78. Quinn also pointed out that Morgan did not discuss implementing a baseball training device using a regulation baseball. Trial Tr. Vol. 2, pp. 172-73. Moreover, he acknowledged that Morgan taught only the provision of indicia for throwing a single type of pitch on each training device, instead of three sets of indicia as required in the asserted claims. Trial Tr. Vol. 2, p. 145.

The jury also heard from Mr. Richard Stitt, the attorney who prosecuted the '193 patent. Stitt testified at length about the prosecution history of the '193 patent and the fact that Pratt and Morgan were considered by the PTO throughout the entire pendency of McGinley's application. He confirmed that the "phantom lines" in Pratt's drawings were not actually marked on a baseball. Trial Tr. Vol. 3, p. 56. Stitt also pointed out that the PTO never rejected the asserted claims as obvious in view of Pratt, and that it was never suggested by the PTO that the phantom lines of Pratt could easily be transferred to the actual baseball to arrive at McGinley's

claimed invention. Trial Tr. Vol. 3, pp. 57–58.

Stitt testified that the PTO never rejected McGinley's claims by saying that one could substitute the "elongate finger-shaped markings" shown in Figure 6 of Morgan in place of the "circular dots" in Pratt. Trial Tr. Vol. 3, p. 63. He also pointed out that the PTO could have issued an obviousness rejection of the asserted claims based on a theory of transferring Pratt's phantom lines onto the baseball, but never did so. Trial Tr. Vol. 3, p. 185. Similarly, he testified that the PTO could have issued an obviousness rejection of the asserted claims based on a theory of combining Pratt with Morgan, but never did so either. Trial Tr. Vol. 3, p. 186.

Stitt also testified that he flew to the Patent Office in Washington, D.C., with McGinley for an interview with the Examiner to discuss the differences between Pratt and Morgan and the claimed invention. Trial Tr. Vol. 3, pp. 142–145. Finally, he explained in detail why neither Pratt nor Morgan alone or in combination with each other would provide the claimed "means for orientation." Trial Tr. Vol. 3, pp. 150–52.

In addition, McGinley relied heavily on the presumption of validity to which his patent is entitled by the terms of 35 U.S.C. § 282, mainly in the context of Stitt's tutorial concerning how McGinley's patent was prosecuted, and in McGinley's opening statement and closing argument to the jury. As noted above, throughout the trial, McGinley pointed out that both the Pratt and Morgan references were before the examiner who tested McGinley's patent for validity. Indeed, those two references were discussed in an interview between the applicant and the examiner. The examiner rejected McGinley's claims as anticipated by Pratt, and made no mention of any concern as to obviousness in

view of Pratt alone or of a combination of Pratt and Morgan. The Board of Patent Appeals and Interferences reversed the examiner's anticipation rejection, holding that Pratt failed to teach McGinley's means for orienting the baseball relative to the palm of the hand. In due course, McGinley's patent issued and became clothed with the statutory presumption of validity, with no obviousness challenge having been mounted against it, either on the basis of Pratt alone, or of Pratt in combination with Morgan.

The jury in this case was expressly charged that the patent in suit is entitled to the presumption of validity, and that FSI could only overcome that burden with clear and convincing evidence to the contrary. It is well established in our case law that FSI's burden in this case was especially heavy:

When no prior art other than that which was considered by the PTO examiner is relied on by the attacker [FSI], he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents. In some cases a PTO board of appeals may have approved the issuance of the patent.

American Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1359, 220 USPQ 763, 770 (Fed.Cir.1984), *cert. denied*, 469 U.S. 821, 105 S.Ct. 95, 83 L.Ed.2d 41 (1984).

[19] Perhaps McGinley's best argument to save his claims from *prima facie* obviousness in the light of Pratt and Morgan is his contention that those references together teach away from their combina-

tion. We have noted elsewhere, as a "useful general rule," that references that teach away cannot serve to create a prima facie case of obviousness. *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130 (Fed.Cir. 1994). If references taken in combination would produce a "seemingly inoperative device," we have held that such references teach away from the combination and thus cannot serve as predicates for a prima facie case of obviousness. *In re Sponnoble*, 405 F.2d 578, 587, 160 USPQ 237, 244, 56 C.C.P.A. 823 (1969) (references teach away from combination if combination produces seemingly inoperative device); see also *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed.Cir.1984) (inoperable modification teaches away).

McGinley argues in his brief that Pratt itself teaches away from combining the finger orientation of Morgan, because Pratt, by teaching only the placement of finger tips on the baseball, leads away from placing a full finger orientation on the ball. Such may be the case, but we have no assurance that the jury heard that argument. At oral argument in this court, however, FSI confirmed that McGinley argued to the jury that adding the finger marks of Morgan to Pratt's baseball, by "filling in" the phantom marks to create structure that defines orientation as claimed, would require obliteration of the claimed rotation arrows, a feature that is necessary in order to permit the Pratt invention to operate properly. FSI also confirmed at oral argument that the jury heard McGinley's argument that to combine the finger placements of Morgan onto the Pratt ball would also render the Pratt ball inoperable, by eliminating the multi-colored equatorial band, a claimed feature of the Pratt patent also required for successful operation of Pratt's invention.

We are satisfied that McGinley presented sufficient evidence as well to counter FSI's alternative argument that it would

have been obvious to place three sets of marks on the Morgan ball in light of the teaching of Pratt. First, a reasonable jury could have determined from examining the Morgan reference that the finger placement indicia on Morgan are too large to allow the inclusion of more than a single set of markings. This point is important, because Morgan expressly requires markings on the ball to accommodate the placement of two full fingers and a thumb to simulate throwing a single pitch. The jury could have certainly concluded that one of ordinary skill would not attempt to place markings for two additional pitches on Morgan's ball. Two more sets of markings as shown by Morgan itself would require markings for two additional sets of fingers and thumbs. On the other hand, two sets of markings as shown by Pratt would lead to confusion as to the correct means for orientation on Morgan's ball. Any such configurations, *i.e.*, Morgan's invention with markings for throwing three different pitches, would risk, if not achieve, obliteration of the clear and unmistakable markings shown on Morgan's ball to teach the throwing of a single curving pitch. Moreover, a reasonable jury could have considered that all of the embodiments described and illustrated in the Morgan reference are expressly limited to teaching a student pitcher to throw a baseball with a "particular curve or break," and that none of the embodiments discuss or suggest using a conventional baseball as opposed to a hollow shell comprising two metallic or plastic hemispheres glued or otherwise bonded together. The jury also could have concluded that Morgan—with its full finger and thumb imprint markings on the ball—teaches away from a means for orientation using the smaller tear-drop markings disclosed by McGinley or the

small truncated finger-shaped markings used in FSI's accused baseballs.

[20] Given the strength of the teaching away point, we think it remarkable that FSI makes no attempt whatsoever in its brief to counter McGinley's argument. The jury's verdict that the claims in suit are not obvious is supported by the evidence brought forward by McGinley to resist FSI's contrary evidence. Here we have the classic example of sufficient evidence to support each position argued to the jury. The key issue, namely what the references teach and whether they teach the necessity of combination or the requirement of separation, is a fact issue. When the jury is supplied with sufficient valid factual information to support the verdict it reaches, that is the end of the matter. In such an instance, the jury's factual conclusion may not be set aside by a JMOL order.

Given the multiple bases upon which the jury's verdict in favor of McGinley can be sustained over FSI's arguments for combining the references, we must conclude that FSI fares no better in arguing a combination of Pratt into Morgan than it does in arguing a combination of Morgan into Pratt. The jury was thus entitled to reach its verdict of nonobviousness on the ground that one of ordinary skill in the art would not deem the asserted claims of the '193 patent obvious in light of Pratt and Morgan in combination. That being the case, it is illogical to think that one of ordinary skill in the art would have deemed McGinley's claims obvious in the light of Pratt alone. If one of ordinary skill is not taught by Morgan to extend Pratt's circular markings into the phantom lines, that person would not be taught by the phantom lines alone to do so. Nonetheless, we think the district court erred as well in its decision that McGin-

ley's asserted claims were obvious as a matter of law in view of Pratt alone. A21-22. According to the district court's reasoning, no reasonable jury could have failed to conclude that an ordinarily skilled artisan would have been motivated to transfer the finger-shaped "phantom lines" shown in the Pratt reference onto the actual Pratt baseball itself, thus providing the missing "means for orientation" that is admittedly otherwise missing in Pratt.

It should be noted that the "phantom lines" shown in Pratt are virtually identical to the finger-shaped markings on Fig. 6 of the Morgan reference, except that the Morgan markings are "filled-in" and actually marked on the ball. Therefore, many of the arguments mentioned above with respect to Morgan apply with equal force with respect to the Pratt phantom lines. Specifically, as FSI conceded at oral argument before this court, the jury heard McGinley's argument that transferring large finger-shaped markings (such as those illustrated in Fig. 6 of Morgan or in the phantom lines of Pratt) would render the Pratt invention inoperable by interfering with the multi-colored equatorial band. Thus, according to this evidence, one of ordinary skill in designing baseballs for use as pitching trainers would not be motivated to modify Pratt by filling in the phantom lines to express palm-oriented finger placement on the ball. As mentioned above, the jury also heard extensive testimony concerning the prosecution history of the '193 patent, including the critical facts that (1) Pratt was before the PTO during the entire pendency of the patent application, and (2) although the PTO continued to reject the asserted claims as anticipated by Pratt until McGinley won an appeal before the Board on that point, the PTO never rejected the asserted

claims as obvious in view of Pratt alone. Surely, relying on the presumption of regularity that applies to all administrative agencies such as the PTO, the jury could have reasonably concluded that if the PTO believed that an obviousness rejection based on Pratt alone was warranted, such a rejection would have been promptly been made. Also, just as was the case with the Morgan markings, the jury could have reasonably concluded from an examination of the references that the Pratt phantom lines are so large that it would not be feasible to include three sets of them on a single baseball, as required by the asserted claims. Because substantial evidence supports the jury's implicit factual finding that no motivation to modify Pratt in that manner has been demonstrated in this case, the district court's ruling that Pratt alone renders the asserted claims obvious as a matter of law was erroneous.

Due to the "black box" nature of the jury's verdict, it is impossible to determine which of the above pieces of evidence, alone or in combination, carried the day in the jury room, and how much weight was assigned to each piece. All that can be said with certainty is that—as a whole—the evidence enumerated above (all of which was admittedly before the jury) constitutes substantial evidence to support the jury's verdict. We recognize the concerns of the dissenting opinion that it is difficult to sort out the weight to be given factual determinations in an obviousness inquiry from the degree to which the district court should override permissible found-facts to sum-up the legal conclusion of obviousness *vel non*. But when a dispositive element of the factual equation, here whether to combine or modify key references, so clearly could have been decided by the jury in McGinley's favor, it is not our

place to elide the vagaries of a black box jury verdict by overriding the jury's decision. Our law does not compel the use of special verdicts in these cases, and so long as the parties are content to give the jury unfettered room to operate on dispositive factual issues, within the scope of a general verdict request, we must be mindful of our role as an appellate court and respect the verdict reached, notwithstanding what may seem to some to be an invention of little novelty.

For the reasons set forth above, we conclude that the district court erred when it ruled on JMOL that no reasonable juror could have ruled that FSI failed to make out a case of obviousness by clear and convincing evidence.

V

Denial of McGinley's Motion to Amend Complaint

[21] More than one year after McGinley had filed its initial complaint against FSI in this case, and almost two months after the deadline that had been set by the district court for filing a motion to join additional parties, McGinley sought to add his own company and oral exclusive licensee, S.C. Products, Inc. ("SCP"), as a plaintiff. Apparently, McGinley and SCP are "one and the same," and McGinley is the sole shareholder of SCP. However, in a technical corporate sense, the RCIB was sold by SCP, not by McGinley.

The district court denied McGinley's motion, and articulated the following bases for its decision:

The court, in its May 10, 1999 telephone conference, found that both parties have been equally dilatory in preparing this case for trial, and therefore denied the plaintiff's motion for an extension of the deadline to file amended pleadings. The

plaintiff's current motion to amend comes nearly two months after the deadline for such motions. The court believes that, had the plaintiff diligently sought to bring the matter to trial, the plaintiff could have brought this motion to amend within the deadline specified in the scheduling order. For example, the plaintiff did not complete depositions of defendant and its representatives—the very depositions on which he in part bases his motion to amend—until the week of May 17, 1999, some six weeks after the deadline for motions to amend.

[22–24] A district court's decision to grant or deny a motion for leave to join a party involves a procedural question that raises no special issues relating to patent law, and therefore Tenth Circuit law applies in this case. *Sun-Tek Indus., Inc. v. Kennedy Sky Lites, Inc.*, 856 F.2d 173, 175, 8 USPQ2d 1154, 1156 (Fed.Cir.1988). In the Tenth Circuit, this issue is reviewed for an abuse of discretion. *Scheufler v. Gen. Host Corp.*, 126 F.3d 1261, 1270 (10th Cir.1997). In this case, we can safely conclude that the district court did not abuse its discretion. Trial courts are given broad latitude in managing and scheduling cases, and therefore the stated bases for the district court's decision to deny McGinley's motion are entirely reasonable. See *Foman v. Davis*, 371 U.S. 178, 182, 83 S.Ct. 227, 9 L.Ed.2d 222 (1962) (stating that undue delay may form a proper basis for a court to exercise its discretion to deny a plaintiff's motion to amend its complaint).

VI

Denial of FSI's Motion for New Trial on Willfulness

[25] FSI argued at trial that it did not willfully infringe the '193 patent on the basis that it allegedly had a reasonable, good faith belief that the patent was inval-

id. FSI did not rely upon advice of counsel to demonstrate this belief. Instead, FSI sought to demonstrate its good faith belief through the testimony of its corporate representative and vice president of marketing, Charles Quinn, who was to testify as to FSI's understanding of the Pratt and Morgan patents. At trial, the district court prevented Quinn from testifying as an ordinarily skilled artisan in the invalidity portion of the trial, since he was not qualified as an expert under Federal Rule of Civil Procedure 26.

After the jury verdict, along with its motion for JMOL of invalidity, FSI argued in the alternative that it was entitled to a new trial on willfulness, without citing any particular basis for granting the motion, other than referring to evidence presented at trial tending to show that FSI's infringement was not willful. In its briefs on appeal, FSI argues for the first time that it is entitled to a new trial because it was denied a fair opportunity to present its allegedly "key piece of exculpatory evidence" at trial (*i.e.*, Quinn's testimony as to FSI's understanding that the '193 patent was invalid in view of Pratt and Morgan). The district court denied the motion for a new trial on willfulness, stating as follows:

[E]ven if the Federal Circuit were to reverse this court on its JMOL determination, the jury's willfulness finding should not be set aside nor should defendant be entitled to a new trial. The crux of this opinion is that the '193 patent is obvious as a matter of law; if the court is deemed to be incorrect in that conclusion, that is, if there actually was a question of fact for the jury on obviousness, then, as plaintiff discusses in his responsive papers, the evidence presented supports the jury's conclusion that the infringement was willful and, also, the verdict was not so contrary to

the weight of that evidence as to mandate a new trial.

[26] The denial of FSI's motion for a new trial is a procedural issue not unique to patent law, and is therefore reviewed in this case under the Tenth Circuit's abuse of discretion standard. *Smith v. Ingersoll-Rand Co.*, 214 F.3d 1235, 1242 (10th Cir.2000); accord *Shearing v. Iolab Corp.*, 975 F.2d 1541, 1544, 24 USPQ2d 1133, 1136 (Fed.Cir.1992).

We conclude that the district court did not abuse its discretion in denying FSI's motion for a new trial. Because FSI failed to make any offer of proof under Rule 103 of the Federal Rules of Evidence, nothing in the record indicates what Quinn would have said on the stand if asked. *Sorensen v. City of Aurora*, 984 F.2d 349, 355 (10th Cir.1993) (finding no abuse of discretion in denying new trial where party failed to establish sufficient factual record for appellate court to consider propriety of excluding testimony). Moreover, we are satisfied that—even without being allowed to present Quinn's allegedly exculpatory evidence—FSI took advantage of its fair opportunity to present evidence concerning FSI's independent development of the accused 2705 baseball and its alleged acts of good faith to the jury.

VII

Conclusion

For the reasons stated above, we reverse the grant of JMOL in favor of FSI and order the jury's verdict reinstated. We leave undisturbed, however, the district court's other judgments, rulings, and orders on appeal, thereby affirming the remaining questions raised by McGinley and the cross-appeals presented by FSI. The case is returned to the district court for further proceedings not inconsistent with this opinion.

Costs

No costs.

REVERSED-IN-PART AND AFFIRMED-IN-PART

MICHEL, Circuit Judge, dissenting.

Because I conclude that the Pratt patent, alone, renders the patented invention obvious as a matter of law, I would affirm. I am especially troubled by the implication I see in the majority's opinion that a general jury verdict on the legal question of obviousness is essentially immune from review by the trial court on JMOL, or by this court on appeal.

The issue presented in this appeal derives from the common, if unfortunate, practice of allowing the jury to render a general verdict on the ultimate legal conclusion of obviousness without requiring express findings on the underlying factual issues through a special verdict or special interrogatories under Fed.R.Civ.P. 49. Nevertheless, since the inception of our court, we have recognized that a court may submit this legal question to a jury and that doing so by general verdict rather than by Rule 49 is not ordinarily an abuse of discretion. *Railroad Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1515, 220 USPQ 929, 937 (Fed.Cir.1984); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1547-48, 220 USPQ 193, 197 (Fed.Cir. 1983). We have emphasized, however, that "[t]here is no question that the judge must remain the ultimate arbiter on the question of obviousness." *Railroad Dynamics*, 727 F.2d at 1515, 220 USPQ at 937; see also *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1479, 44 USPQ2d 1181, 1183 (Fed.Cir.1997) ("That an obviousness determination stands upon the relevant facts of the case does not convert the ultimate conclusion of obviousness from one of law into one of fact.").

The difficulty presented in this appeal is how to separate the role of the jury to find facts (with these findings binding on this court, as well as the trial court, so long as they are supported by at least substantial evidence) from the role of trial judges in reaching, or for us freely reviewing, the ultimate legal conclusion of obviousness, *vel non*. In this case, the verdict form tells us only that the jury found the claimed invention nonobvious in light of Pratt and/or Morgan, with no identification of the jury's resolution of genuine disputes over material factual issues. We must therefore imply such factual findings, under the legal presumption that the jury found all facts necessary to support its verdict in favor of McGinley. *Railroad Dynamics*, 727 F.2d at 1516, 220 USPQ at 937 ("[W]hen a jury returns a general verdict, the law presumes the existence of fact findings implied from the jury's having reached that verdict.").

When faced with a general verdict of nonobviousness or obviousness, the categories of facts the court must imply concern the scope and content of prior art; what a prior art reference teaches; the differences between the claimed invention and the prior art; the level of ordinary skill in the prior art; and objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 14, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966); *Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 192 F.3d 1353, 1359, 52 USPQ2d 1294, 1298 (Fed.Cir.1999). In cases such as this where a single prior art reference is alleged to render the claimed invention obvious, there must be a sufficient showing of a suggestion or motivation for any modification of the teachings of that reference necessary to reach the claimed invention in order to support the obviousness conclusion. *SIBIA Neuroscis., Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1356, 55 USPQ2d 1927, 1931 (Fed.Cir.2000); *B.F.*

Goodrich Co. v. Aircraft Braking Sys. Corp., 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed.Cir.1996). This suggestion or motivation may be derived from the prior art reference itself, from the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. *SIBIA*, 225 F.3d at 1356, 55 USPQ2d at 1931.

While the trial court must defer to the jury's factual findings, actual or implied, the court nonetheless has the duty, when presented with a motion for JMOL following a general verdict on obviousness, to review the factual findings for substantial evidentiary support, and the ultimate conclusion on obviousness for legal correctness. *Railroad Dynamics*, 727 F.2d at 1513, 220 USPQ at 936 ("The moving party is entitled to JNOV when the court is convinced: (1) that reasonable persons could not in light of that evidence have found the facts necessary to support the jury's verdict; or (2) that the facts properly found cannot in law support that verdict."). In the present case, the trial court dutifully performed this analysis, citing our precedent, and concluded that no reasonable jury could find that Pratt did not render McGinley's claimed baseball obvious. I agree.

The only arguable difference between Pratt's and McGinley's claimed marked baseballs for student pitchers is that Pratt purportedly lacks a "means for indicating the orientation of the baseball relative to the palm of the hand," a limitation separately claimed by McGinley. U.S. Patent No. 5,407,193, col. 5, ll. 41-42. There has been no admission, as the majority suggests, that Pratt does not disclose a "means for orienting." The structures corresponding to this means-plus-function limitation in McGinley's claimed baseball are sets of finger markings, shaped like tapered eggs, with the direction of the

taper indicating the proper orientation of the ball in the pitcher's hand. That is, the points of the tapers, by extension, lead approximately to the center of the palm.

The fingertip placement markings illustrated in Pratt's diagrams, by contrast, are simple circles with no taper, and thus do not point toward the palm.

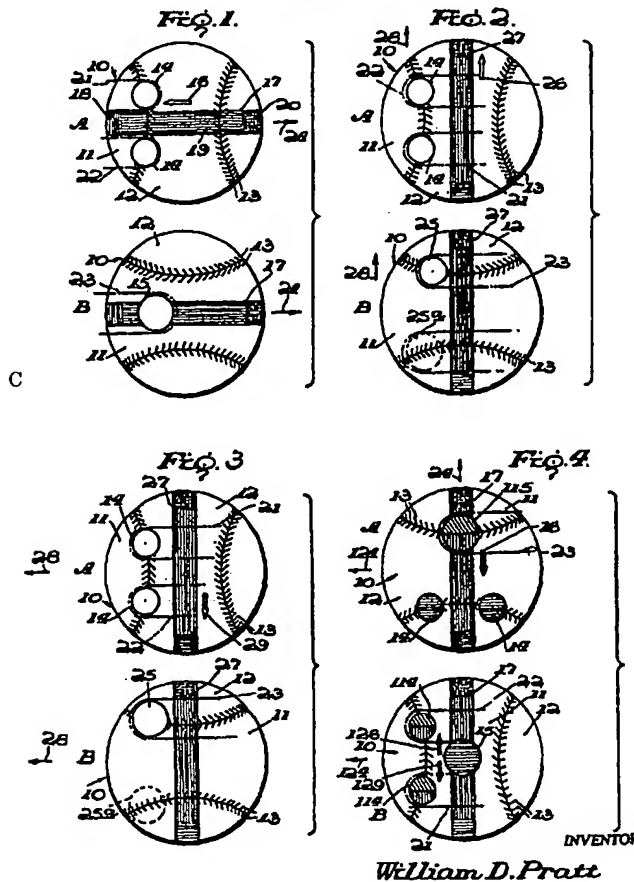
Feb. 16, 1960

W. D. PRATT

2,925,273

BASEBALL TRAINING AID

Filed April 25, 1969



The jury did indeed hear testimony to the effect that Pratt's rounded fingertip placement indicia would leave a student pitcher confused as to how to grip the ball, as the pitcher would be unsure whether to grip the ball on only one of its hemispheres, or rather to grasp the ball fully across its equator. Mr. Richard Stitt, the attorney who prosecuted the '193 patent, testified that the symmetry of Pratt's fing-

ertip markings would frustrate gripping the ball " 'cause if the opposite side of that ball looks the same as the side we're looking at, you don't know which to approach it from, and that's a critical question." Trial Tr., Vol. 3, p. 201. Contrarily, Mr. Stitt testified that "if we had a—a taper on one end of this circle, I would know to approach the ball." Trial Tr. Vol. 3, p. 218.

Such testimony, in my view, is a nullity because it contradicts the teachings of the Pratt patent, which by its very markings necessarily discloses a means for orienting a pitcher's fingers on the ball "relative to the palm." As illustrated here, Pratt's diagrams show multiple sets of fingertip placement indicia, with a single set comprising two circles situated near each other (described in the specification as markers for the pitcher's forefinger and second finger) and a third spot somewhat removed from the other two (described as a marker for the thumb). As a matter of geometry, there are only two ways for a pitcher to place his or her thumb, forefinger, and second finger on these three spots (barring finger-crossing). One way is to pinch the near hemisphere of the baseball with one's fingertips. The other way is to grasp the ball near the palm of one's hand, wrapping one's fingers across the equator of the ball (i.e., the way a baseball is always thrown).

Pratt's written description tells us that people of ordinary skill in this art (and student pitchers) know generally how to hold and throw baseballs. The patent states that, for a fastball, the ball is thrown with "the usual forearm motion." U.S. Patent No. 2,925,273, col. 2, ll. 25-26. A fingertip grip on only one hemisphere of the ball would be unworkable, as for a curveball, the patent recites using a "tighter grip," and throwing the ball with a "conventional wrist snap," so as to impart a "maximum spin" to the ball. *Id.* at col. 2, ll. 53-54. To do so, the forefinger and second finger must "extend across two sections of the stitches of the seam," such that the thumb "extends along the seam." *Id.* at col. 2, ll. 50-52. These instructions, read in view of the finger placement indicia, reduce the number of possible palm orientations to one: the ball-in-palm grip. Because Mr. Stitt's testimony contradicts the express teachings of Pratt, his testimonial evidence is entitled to no weight. I

conclude that the express teachings of Pratt, as a matter of law, disclose to persons of ordinary skill a means for orienting the ball in the pitcher's palm.

Of course, in the context of a means-plus-function claim, the invalidating prior art must disclose not simply a means for achieving the desired function, but rather the *particular structure* recited in the written description corresponding to that function, or an equivalent thereof. *In re Donaldson Co., Inc.*, 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1849 (Fed.Cir.1994). To this end, the Pratt patent discloses more than just circular fingertip markings, as his diagrams also display "phantom lines" (which do not appear on the actual ball covered by the patent) extending tangentially from the fingertip placement circles in the direction that a pitcher's fingers should be placed. FSI argues here, as below, that these phantom lines would have taught skilled artisans to extend tangentially Pratt's circular markings to give them directionality.

At trial, Mr. Stitt discounted the importance of these phantom lines, testifying that "[t]hey don't have anything to do with the invention." Trial Tr. Vol. 3, p. 183. This remark was legally incorrect, because although the phantom lines do not appear on Pratt's patented ball, they do comprise part of Pratt's disclosure. See *In re Fritch*, 972 F.2d 1260, 1264, 23 USPQ2d 1780, 1782 (Fed.Cir.1992) ("It is well settled that a prior art reference is relevant for all that it teaches to those of ordinary skill in the art."). McGinley also argues in his briefing that adopting the phantom lines from Pratt would be unworkable, because these lines would be too long and would obscure other markings on the baseball. The majority accepts this argument. But absolutely no trial testimony—none—

suggests that Pratt's phantom lines are too long, or that their length as shown in the drawings would have dissuaded a skilled artisan from shortening the finger placement indicia as necessary to avoid obscuring any other markings. Mere attorney argument is no substitute for evidence of record. To support its holding (and its statement that the issue of motivation to modify Pratt's lines into McGinley's tapers "so clearly could have been decided by the jury in McGinley's favor"), the majority combines testimony discussing the elongated finger grooves from Morgan with the testimony concerning the circular fingertip placement markings of Pratt. But by importing testimony regarding Morgan into its Pratt analysis, the majority appears to contradict its own holding that these references are not combinable. Moreover, putting aside the lack of evidence on this point, it hardly matters that the phantom lines as shown are longer than they need be if they were actually drawn onto the ball. An artisan need not copy the lines precisely as shown, but instead would know to optimize the length of the lines to fit the constraints of the other marking on the ball. See *In re Baird*, 16 F.3d 380, 383, 29 USPQ2d 1550, 1552 (Fed.Cir.1994) ("[A] reference must be considered not only for what it expressly teaches, but also for what it fairly suggests.") (quoting *In re Burckel*, 592 F.2d 1175, 1179, 201 USPQ 67, 70 (1979)). Such a design variation would be routine in the baseball design art.

Presumably, the jury found that the phantom lines depicted in Pratt's diagrams would not have motivated a reasonable artisan to elaborate on Pratt's circular fingertip placement indicia and break their symmetry. However, the only trial testimony supportive of this finding—i.e., Stitt's comment that the phantom lines have nothing to do with the invention—is

legally incorrect. Aside from this remark, and testimony concerning the Morgan patent (which the majority finds to be non-analogous), there is simply no evidence, let alone substantial evidence, in support of the jury's implicit finding. Moreover, this implicit finding is contradicted by the disclosures of Pratt, itself. Pratt clearly contemplated the possibility that the reader of his patent might not immediately appreciate the proper orientation of a pitcher's fingers—that is why he added the phantom lines to his drawings. By including these lines in his disclosure, Pratt imposed directionality on his circular markings in the drawings and necessarily communicated to those in his field a suggestion for reshaping the circular fingertip placement indicia accordingly. To the extent the jury's implicit findings are to the contrary, I find them unsupported by substantial evidence and contrary to Pratt's express and graphic disclosures. To the extent the jury rested its conclusion on such findings, it was legally incorrect.

It is true that the jury found that the Pratt patent does not anticipate McGinley's invention. I do not dispute that the differences between Pratt's circular indicia and McGinley's tapered, egg-shaped indicia, may be sufficient to support the jury's non-anticipation verdict. But obviousness is different. It remains the province of the court to determine, whether in light of all the facts properly, if only implicitly, found by the jury, the claimed invention would have been obvious. *Richardson-Vicks*, 122 F.3d at 1479, 44 USPQ2d at 1183; *Railroad Dynamics*, 727 F.2d at 1515, 220 USPQ at 937. We of course must view all supportable facts as found in favor of McGinley, the verdict winner and non-movant. But it is undeniable (by looking at Pratt's placement of the circular markings, and the accompanying written de-

scription) that Pratt discloses a means for orienting a pitcher's fingers around the ball "relative to the palm." Moreover, the phantom lines suggest altering Pratt's circular markings to provide them with directionality, and to break the symmetry of the circular fingertip indicia. I acknowledge that there are differences between the scope and content of the prior art and the claimed invention. But this is where the legal analysis, as opposed to the fact analysis, begins. It is the role of the court to assess whether in light of these differences and the suggestion to modify the teachings of Pratt, the claimed invention would have been obvious. Viewing all these factual considerations in context, I cannot shake the conviction that a ball designer of even minimal skill in the art would have found it blatantly obvious to modify Pratt's circles (with their phantom lines), and reshape them into tapered eggs. Nor do McGinley's purportedly fabulous sales change my conclusion, because there is no evidence that these sales are due to the markings on the ball, as opposed to Roger Clemens' endorsement, or advertising. Accordingly, I conclude that McGinley's patent was proven invalid for obviousness.

I am concerned about far more important effects of today's ruling than whether McGinley's patent, although invalid, stands to menace still other baseball competitors. Rather, I am concerned that after reading the majority opinion, trial courts and our panels will hereafter consider such general verdicts on obviousness immune from meaningful review and that serious legal errors by juries will thus go uncorrected. The result will be that defective patents will remain to threaten all competitors in an industry. Indeed, I think today's appeal represents just such a case. More may follow. It is rare to see such a com-

elling case of obviousness, and yet more surprising to find our supposedly de novo review so limited, despite our settled case law that a jury's ultimate conclusion on obviousness is a legal question freely reviewable by judges. I therefore respectfully dissent.



WINBOND ELECTRONICS CORPORATION and Winbond Electronics North America Corporation, Appellants,

and

Silicon Storage Technology, Inc., Appellant,

and

Sanyo Electric Co., Ltd., Appellant,

and

Macronix International Co., Ltd. and Macronix America, Inc., Intervenor,

v.

INTERNATIONAL TRADE COMMISSION, Appellee,

and

Atmel Corporation, Intervenor.



C

In re RATTI

Court of Customs and Patent Appeals
Appl. No. 6452

Decided Sept. 30, 1959

United States Patents Quarterly Headnotes

PATENTS

[1] Evidence--Judicial notice (§ 36.20)

It is common knowledge that resilient deformable materials such as natural or synthetic rubber are incompressible, i.e., while they may be deformed, this can occur only if design and mounting of part permits resilient material to change its shape in response to applied forces.

PATENTS

[2] Patentability -- Anticipation -- Combining references (§ 51.205) Patentability -- Anticipation -- Modifying references (§ 51.217)

Combination of J patent with C patent is not proper ground for rejection of claims since combination would require substantial reconstruction and redesign of elements shown in C as well as change in basic principles under which C construction was designed to operate; once applicant taught how this could be done, redesign may, by hindsight, seem to be obvious to one having ordinary skills in art, but, when viewed as of time applicant's invention was made, and without benefit of applicant's disclosure, court finds nothing in art of record which suggests applicant's novel device.

PATENTS

[3] Court of Customs and Patent Appeals--Issues determined--Ex parte patent cases (§ 28.203)
Rejection reversed by Board is not before court.

PATENTS

[4] Patentability--In general (§ 51.01)
Novelty alone is not enough for patentability.

PATENTS

[5] Patent grant--In general (§ 50.01)

Applicant is entitled to patent, under the statutes, unless one of the prohibitory provisions of statutes applies.

PATENTS

[6] Patentability--In general (§ 51.01) Patentability--Evidence of--In general (§ 51.451) Patentability--Utility (§ 51.75)

Statutory requirements for patentability are novelty, usefulness, and unobviousness, as provided in 35 U.S.C. 101, 102, and 103; while proof that invention is better or possesses advantages may be persuasive of existence of any one or all of the requirements, and hence be indicative of patentability, Congress has not made such proof a prerequisite to patentability; moreover, Congress has never required that each and every patentable invention involve "progress" in the sense that it must possess some definite advantage over prior art; hence, it is improper to reject claim on ground that it does not possess some definite advantage over prior art; while R.S. 4893 may be said to have given Commissioner some discretion in refusing to grant patent on an otherwise patentable invention unless "the same is sufficiently useful and important," Congress removed this provision from new 35 U.S.C. 131; this is further indication that it is intent of Congress that patentability be determined solely by sections 101, 102, and 103.

PATENTS

[7] Court of Customs and Patent Appeals--In general (§ 28.01) Pleading and practice in Patent Office--In general (§ 54.1)

It is duty of Patent Office and Court of Customs and Patent Appeals to apply law as Congress wrote it.

PATENTS

Particular patents--Oil Seal
Ratti, Oil Seal, claims 1, 4, 7, and 10 of application allowed.

Appeal from Board of Appeals of the Patent Office.

Application for patent of Ferdinand J. Ratti, Serial No. 359,325, filed June 3, 1953; Patent Office Division 52. From decision rejecting claims 1, 4, 7, and 10,

applicant appeals. Reversed; Kirkpatrick, Judge, dissenting with opinion in which Worley, Chief Judge, joins.

CROMWELL, GREIST & WARDEN (RAYMOND L. GREIST of counsel) both of Chicago, Ill., for appellant.

CLARENCE W. MOORE (S. WM. COCHRAN of counsel) for Commissioner of Patents.

Before WORLEY, Chief Judge, RICH, MARTIN, and SMITH, Associate Judges, and KIRKPATRICK, Judge ^{FNa1}.
SMITH, Judge.

This is an appeal from the decision of the Board of Appeals of the United States Patent Office affirming the rejection by the Primary Examiner of claims 1, 4, 7 and 10 of appellant's application serial No. 359,325, filed June 3, 1953, for a patent on an "Oil Seal" for sealing the space between a bore in a housing and a relatively movable shaft centrally located in the bore.

*350 Claim 1 is representative of claims 4 and 7 and reads:

1. A seal for insertion in a cylindrical bore in a housing about a relatively movable centrally located shaft, comprising an annular bore-engaging mounting portion of resiliently deformable material for endwise insertion in and statically sealed engagement with the bore in the housing, an annular shaft-engaging portion connected with said bore-engaging portion for running engagement with the shaft, and a *metal ring* located adjacent one end of said bore-engaging portion, said ring being *provided with a plurality of axially extending outwardly biased spring fingers in outwardly clamped engagement with said bore-engaging portion* inwardly of the outer periphery of the latter, and said ring being *also provided outwardly of said bore-engaging portion with means for detachably connecting the ring to the housing* outwardly of the bore in the latter. (Emphasis ours.)

Claim 10 differs from the other claims on appeal and reads:

10. A seal for insertion in a cylindrical bore in a housing about a relatively movable centrally located shaft, comprising a sealing ring having an outer bore-engaging portion of resiliently deformable material, which portion is of somewhat larger

diameter than the bore in the housing, for press-fit insertion in the bore, and a *metal retaining ring* associated with the sealing ring, said retaining ring being connected with the sealing ring and being provided outwardly of the latter *with resiliently yieldable hook formations which are adapted to be sprung into interlocking engagement with a complementary formation associated with the housing* outwardly of the bore, which engagement acts to prevent axial displacement of the sealing ring relative to the bore in the housing. (Emphasis ours.)

The references in the case are:

Roth, 1,546,942, July 21, 1925.

Norton, 1,951,034, Mar. 1, 1934.

Jepson, 2,544,324, Mar. 6, 1951.

Chinnery et al. (British), 578,526, July 2, 1946.

Appellant's shaft seal comprises an annular sealing member of resilient deformable material which is adapted to be inserted into a cylindrical bore surrounding a relatively movable shaft. The inner portion of the sealing member is provided with a flexible lip which is held in engagement with the shaft by a garter spring. In the outer portion of the sealing member, an annular slot is provided which is concentric with and spaced from the outer periphery of the sealing member. This slot extends axially from the end of the member and provides a pocket in which the axially extending outwardly biased spring fingers of a metallic attaching ring are located. This construction permits the spring fingers to exert a force on the resilient material in the direction of the annular wall of the bore to provide and maintain a snug engagement between the outer surface of the resilient member and the inner surface of the bore. The metallic attaching ring is also provided with radially extending resilient hooks located outwardly of the bore engaging portion of the resilient member. The housing is provided with a complementary formation outwardly of the bore which is engaged by the resilient hooks to provide a snap-on connection between the bore and the seal.

The Roth and Norton patents were relied upon by the examiner in rejecting claim 10, and since both references were considered by the board, we have included them in our consideration of this case. Roth shows a gasket structure for steam train line hose couplings. Norton shows an adjustable repair clamp for bell and spigot joints in which there is provided a sheet metal bridge piece "preferably of spring

material.” The bridge piece is sprung into interlocking engagement with a structural portion of the clamp and exerts its force on a resilient packing ring which, if desired, may be cemented to it.

The Chinnery et al. patent is the reference principally relied upon by the Patent Office. It shows a housing provided with a bore surrounding a centrally located shaft. A reinforced and “stiffened” sealing member formed of a material such as rubber, is press fitted into the space between the bore and the shaft. The sealing member has an inner lip held in contact with the shaft by a garter spring. The bore engaging portion of the sealing member is “stiffened” by an axially extending cylindrical sheet metal casing which acts as a reinforcing member for a definite purpose which is described by Chinnery et al. as follows:

Owing to the limited radial space within which the oil seal is to be accommodated, the holding portion of the oil seal cannot be stiffened by being massive. Consequently the holding portion of the present oil seal is stiffened in the known manner by a reinforcement, which may either encase or line, or alternatively constitute, such holding portion and therefore makes the press-fitting contact with the machine part stationary relatively thereto, *or may be an internal reinforcement in the sense that it does not make press*351-fitting contact with the machine part stationary relatively thereto.* (Emphasis ours.)

In Fig. 8 Chinnery et al. shows a radially extending flange at the outer edge of a reinforcing member of the internal reinforcement type which flange extends beyond the sealing member “to such an extent as to serve as a means of attachment of the oil seal to the housing *i*, additional to the interference press fit of the holding portion *a* in the housing recess *g*.” The aforesaid flange is shown attached to the housing by screws or bolts.

The Jepson patent relates to a gasket for sealing the space between the upper and lower vessels of a vacuum-type coffee maker. The gasket is an annular rubber member attached to the lower part of the upper vessel and is designed to fit into the upper part of the lower one. Located in a groove in the gasket is a sleeve member provided with axially and downwardly extending spring fingers which are so biased radially as to urge the lower peripheral portion of the gasket outwardly, thus effecting a tight engagement with the mouth of the lower vessel.

Claims 1, 4, and 7 stand rejected on Chinnery et al. in view of Jepson, on the ground that it would not require “invention” to replace the cylindrical sheet metal reinforcing member, which is secured to the Chinnery et al. sealing member, by an annular set of outwardly biased spring fingers shown by Jepson.

The problems which were solved by appellant's invention existed in this art at the time of his invention despite the Chinnery et al. disclosures. It was appellant rather than Chinnery et al. who provided the art with a shaft seal in which the resilient element of the seal could be readily inserted into a bore in the housing so that it could be removed from the bore and replaced by a new sealing element without mutilation of the sealing surface of the bore. This is particularly important, the specification points out, where the bore is formed in light metal alloys such as are used in aircraft engines and which are relatively soft and easily damaged. In appellant's oil seal, the resilient seal is so constructed that when mounted in the bore, it will establish and maintain a fluid tight relationship between the outer peripheral surface of the resilient seal member and the inside of the bore. Where either natural or synthetic rubber is used as the resilient sealing member in such seals, the rubber in time will take a set or lose its resiliency at least to the extent that the seals soon become ineffective to prevent leakage of oil. When subjected to mechanical pressures and heat, such a rubber sealing element loses its sealing effectiveness at an accelerated rate. The problems in the oil sealing art arising from such use of resilient sealing elements appear to have persisted because of the failure of the art to recognize these characteristics of the rubber sealing element and to so design the resilient element and the mounting therefor as to assure holding the outer circumference of the resilient sealing element in static oil-sealing contact with the inner circumference of the bore in which it is inserted.

Appellant's seal differs from the art of record in at least three respects:

- (1) The provision of the annular slot which extends axially inward from one end of the resilient sealing element. This feature is claimed as part of the combination set forth in claim 4.
- (2) The outwardly biased resilient spring means or fingers inserted in the resilient sealing element. These means are claimed as part of the combination of claims 1, 4 and 7.

(3) The “snap-on” connector which holds the resilient sealing element and engages with a complementary formation associated with the housing outwardly of the bore. This feature is in the combination of claim 10.

The patents cited by the examiner, either alone or in combination, do not disclose a resilient shaft sealing element having these features.

[1] It is common knowledge that resilient deformable materials such as either natural or synthetic rubber are incompressible, that is, while they may be deformed, this can occur only if the design and mounting of the part permits the resilient material to change its shape in response to the applied forces.

The seal construction disclosed in Chinnery et al. is such that the “interference press fit” which that patent calls for is alone relied on to keep the seal tight. There is nothing in the Chinnery et al. patent to show how the resilient sealing element is *maintained* in resilient contact with the bore otherwise than by the resiliency of the rubber. If and when that resiliency is lost, the sealing effect will be impaired.

Considering the incompressible nature of the rubber in the sealing element disclosed in Chinnery et al., its stiffening and reinforcement by the cylindrical sheet metal member, and its “interference press fit” in the bore, it seems clear to us that the Chinnery et al. seal cannot function in the manner of appellant's seal. Now, as to the contention that Jepson would suggest inserting a set of spring fingers, the resilient element of Chinnery et al. is forced so tightly into the bore *352 and is so “stiffened” that the use of the resilient spring fingers of Jepson could not possibly increase the resilient deformation of the Chinnery et al. seal in the direction of the bore or increase the sealing engagement of the seal with the bore. The teaching of the Chinnery et al. patent points away from the addition of any spring element. On the other hand, we find nothing in the disclosure of Jepson's coffee maker gasket to suggest that any part of it has applicability to shaft seals. The two arts are at least somewhat remote from each other even if they both involve sealing.

[2] We, therefore, find that Chinnery et al. did not teach the shaft sealing art how to solve the problems which existed in that art at the time of appellant's invention. We hold, further, that the combination of

Jepson with Chinnery et al. is not a proper ground for rejection of the claims here on appeal. This suggested combination of references would require a substantial reconstruction and redesign of the elements shown in Chinnery et al. as well as a change in the basic principles under which the Chinnery et al. construction was designed to operate.

Once appellant had taught how this could be done, the redesign may, by hindsight, seem to be obvious to one having ordinary skills in the shaft sealing art. However, when viewed as of the time appellant's invention was made, and without the benefit of appellant's disclosure, we find nothing in the art of record which suggests appellant's novel oil seal as defined in claims 1, 4 and 7.

We shall now consider the rejection of claim 10, remarking first that it differs from claims 1, 4 and 7 in that it is directed to a combination of a housing bore, a resilient sealing ring and a metal retaining ring connected to the sealing ring, wherein the metal ring has *resilient hooks* which secure the seal in the bore. This claim is not limited to the outwardly biased spring fingers.

The examiner rejected claim 10 on two grounds: (1) that substitution for the screw securing means of Chinnery et al. of a series of spring hooks such as disclosed by Norton would not involve patentable invention, and (2) unpatentability over Roth.

[3] We shall first dispose of the second rejection. The board held that claim 10 is drawn to a combination of a sealing ring and a housing bore in which the sealing ring is detachably placed and that Roth discloses nothing of this nature. The board therefore reversed the rejection on Roth and consequently it is not before us.

As to the first rejection, the board recognized that it was on the ground of unpatentability “over Chinnery et al. in view of Norton” and pointed out that the examiner could see nothing patentable in substituting spring hook attaching means shown in Norton for the screws of Chinnery et al. It then said:

Appellant argues that the references fail to suggest or teach how the proposed [claimed] combination could be made and after a careful consideration of the references, *we have concluded that he is correct in this respect. We therefore concede that the claim * * **

defines novelty over the disclosure of Fig. 8 of Chinnery et al. Novelty alone however, is no proper basis for the allowance of a claim. (Emphasis ours.)

[4] Although, in reaching this conclusion, the board made no reference to Norton, the context compels the conclusion that novelty was found notwithstanding the disclosure of Norton, taken together with Chinnery et al. We fully agree, of course, with the board's statement that novelty alone is not enough for patentability.

With the next statement of the board, in explanation of its affirmance of the rejection of claim 10, we do not agree. It reads:

In order to *properly* define invention [meaning, of course, *patentable* invention], a claim should clearly define a structure *which possesses some definite advantage over the prior art*. As far as we can determine there is *no better* combination of housing and seal produced by using a series of snap fastener connections to connect the seal to the housing, as in appellant's structure, over using a series of bolts, as in the structure shown by Chinnery et al. Both act to merely detachably connect one element to another element and as far as we can find are merely equivalent connecting means especially in the absence of any unexpected result *or advantage* being obtained, by using one means in preference to the other, on which the record before us is entirely silent. (Emphasis ours.)

If we may extract from the foregoing what we understand to be the essence of the board's position in the matter, it is that claim 10 is not patentable, though it defines a combination which is novel over the disclosures of the references, because the claimed combination has not been shown to be any better than, or to possess any advantage over, what was known to the art.

[5] As was pointed out in In re Stempel, Jr., 44 CCPA 820, 241 F.2d 755, 113 USPQ 77, an applicant is entitled to a patent, under the statutes, unless one of the prohibitory provisions of the statutes applies. The statutory requirements

*353 [6] for patentability, broadly stated, are novelty, usefulness and unobviousness, as provided in 35 U.S.C. sections 101, 102, and 103. While it is true that proof that an invention *is* better or *does* possess

advantages may be persuasive of the existence of any one or all of the foregoing three requirements, and hence be indicative of patentability, Congress has not seen fit to make such proof a prerequisite to patentability.^{FNI}

Appellant's invention, as defined in claim 10, has been held by the board to possess novelty over the disclosure of Chinnery et al. Just what the board thought about the pertinency of Norton is obscure but it seems to have regarded this reference as of little moment. Appellant in his brief here said that Norton was held by the board to have no bearing on the invention and the Patent Office brief said that the appellant was correct in so stating and that the court need not consider it. We are, therefore, virtually without any reference against claim 10 except Chinnery et al. and the rejection thereon is predicated solely on a theory of patentability we find to be outside of the patent statutes, namely, that the combination of claim 10 is, by reason of the use of spring retaining hooks instead of a series of bolts, *no better* than the combination of Chinnery et al. However [7] intriguing such a ground of rejection may be, it is the duty of the tribunals of the Patent Office and of this court to apply the law as Congress has written it. While the provisions of the former R.S. 4893 may be said to have given the Commissioner some discretion in refusing to grant a patent on an otherwise patentable invention unless "the same is sufficiently useful and important," when the Patent Codification Act of 1952 was enacted, Congress removed this provision from old section 36 of title 35, now section 131. We take this as a further indication that it is the intent of Congress that patentability be determined solely by the provisions of sections 101, 102 and 103. We therefore reverse the board on this ground of rejection of claim 10.

If the issue before us were whether or not the spring hooks *are* better than the Chinnery et al. bolts--and we consider this in the event we have misapprehended the position of the board--we would hold that they are, on the basis of what is disclosed in the application. This retaining means seems to possess many advantages over screws. Similarly, if the board was intending to say that the hooks and the bolts are merely equivalent connecting means and that claim 10 is unpatentable because its combination differs from the prior art only in the substitution of an equivalent for one element in an old combination, then we would also have to

disagree since we think it is clear that the use of the spring hooks produces a result quite different from the bolts of Chinnery et al. On the record before us no reference relied on shows any spring hooks nor does it contain any support for the contention that bolts and spring hooks are equivalents.

For the foregoing reasons we reverse the rejection of claim 10.

The rejections of claims 1, 4, 7 and 10 are *reversed*.

FN1 United States Senior District Judge for the Eastern District of Pennsylvania, designated to participate in place of Judge O'CONNELL, pursuant to the provisions of Title 28, United States Code, Section 294(d).

FN1 A critical essay on the existing law has recently appeared under the title "A Proposal for: A Standard of Patentability; Consonant Statutory Changes; A Manual on Determination of Patentability," by Malcolm F. Bailey, 41 J.P.O.S. 192-225, 231-257. It advocates, as we understand it, that the present law should be changed to set up as the test for patentability, in place of the requirement of section 103 that an invention be unobvious, a requirement that the invention involve *progress*, which the author finds in the constitutional provisions. Congress has not seen fit to include in the statutes, at any time during the past 169 years so far as we are aware, a requirement that each and every patentable *invention* shall involve "progress" in this sense, i.e., that each new invention must also be shown to possess some definite advantage over the prior art. The author relates the term "progress" to individual inventions and then gives it the connotation that each such invention should be a technical advance, improvement or betterment. The very making of the suggestion to change the law is an indication that the existing law is otherwise.

MARTIN, Judge, concurs in result.

KIRKPATRICK, Judge, dissenting, in which WORLEY, Chief Judge, joins.

I think that the board's rejection of claims 1, 4 and 7

should be affirmed. The central idea and the most important feature of these three claims, as well as of allowed claim 5, is the exertion of outwardly directed pressure upon the bore engaging portion of the sealing member, the result accomplished being to counteract the tendency of rubber to "set" or lose its resiliency and so become ineffective to prevent leakage. Jepson comes very close to completely anticipating this feature of the patent. All that would be necessary to make the anticipation complete would be to provide the Jepson seal with a shaft engaging portion and, incidentally, claim 7 does not specify any shaft engaging portion.

Of course, it was necessary that the seal be attached to the bore in a manner to prevent its displacement. Chinnery provides a flange and screws for this purpose and none of the three claims referred to calls for anything more specific than "means." Thus it seems clear that *354 claims 1, 4 and 7 show no patentable novelty as against the prior art of Chinnery plus Jepson.

The only question is whether Jepson is in a nonanalogous art sufficiently remote from that of the application to put it beyond the probability that it would be considered by persons skilled in the art endeavoring to solve the problem to the solution of which the application is directed. I do not think that it is. Jepson was trying to meet exactly the same problem as the application under consideration, namely, to provide a compressible seal which could be readily detached or inserted in a cylindrical bore but which would maintain a firm and leakproof seat on the bore when in place. I agree with the Solicitor's argument that one seeking to improve a machinery seal would reasonably be expected to investigate not only machinery seals but seals in other arts where similar problems would be encountered. See In re O'Connor, 34 CCPA 1055, 161 F.2d 221, 73 USPQ 433.

Claim 10 stands on a somewhat different basis. This claim entirely omits what I think, and have stated above, to be the heart of the application. In substance, claim 10 really amounts to no more than a claim for a hook formation to interlock with the housing of a bore in order to hold a press fit seal in place. Chinnery discloses means to serve the same purpose consisting of screws.

The board conceded that the combination disclosed in claim 10, consisting of spring hooks to fasten a press fit seal to the bore, disclosed novelty over Chinnery but not patentable novelty.

I do not read the opinion of the board as predicated its conclusion of want of invention on the theory that in order to be patentable a combination must have some distinct advantage over the prior art. The board stated that there was nothing in the record to show that the substitution of hooks for screws produced any unexpected result or advantage and, therefore, concluded that the introduction of hooks did not create patentable novelty, but was a mere substitution of equivalents. The statement that the spring hooks of Ratti were no better than the screws of Chinnery was directed toward this point and seemingly was added to fortify the board's finding of equivalency rather than to propound a theory of patentability. I agree with the board that this claim, though it may show novelty over Chinnery, does not show patentable novelty, and I would affirm its rejection.

FN1 Chinnery discloses a press fit seal, but no one has suggested that there is anything new about such a device and the specification of the application before us concedes that it is old in the art.

Cust. & Pat.App.

Application of Ratti

46 C.C.P.A. 976, 270 F.2d 810, 123 U.S.P.Q. 349

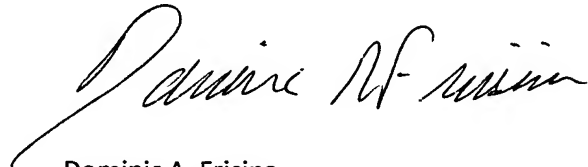
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X. RELATED PROCEEDINGS APPENDIX

No related proceedings exist.

The foregoing arguments and evidence having established that the Examiner's rejections are improper and should be reverse, the Appellant respectfully requests that the Board reverse each rejection and allow the subject claims to issue.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Dominic A. Frisina". The signature is fluid and cursive, with a long horizontal stroke at the beginning.

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